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The Massachusetts Medical Society

The next annual meeting of the Massachusetts Medical Society will be held in Boston, Monday, Tuesday and Wednesday, June 8, 9 and 10, 1931.

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The Massachusetts Medical Society

SECTION OF SURGERY

WEDNESDAY MORNING, JUNE 18, 1930

THE Section of Surgery of the Massachusetts Medical Society convened in the Memorial Building, Plymouth, at nine-fifteen o'clock, Dr. Irving J. Walker, of Boston, Chairman of the Section, presiding.

CHAIRMAN WALKER: The meeting will please come to order.

One of the duties of this meeting is to elect officers for the coming year for this Section, namely, a Chairman and Secretary; therefore, I am going to appoint a Nominating Committee to bring in nominations for Chairman and Secretary: Drs. Day, Palmer, and Daland. They will bring in nominations following the papers, at which time we will have the election.

I believe the speakers in this symposium today need no elaboration in the way of introduction. They are all well known to you as authorities in their various lines, so we will start in immediately with the program and I will ask Dr. Morrison to open. The title of his paper is "The Rôle of X-ray in the Diagnosis of Cancer of the Colon."

THE ROLE OF X-RAY IN THE DIAGNOSIS OF CARCINOMA OF THE COLON*

BY L. B. MORRISON, M.D.†

MY desire this morning is to acquaint you a little more fully with the picture of cancer of the colon from the standpoint of the roentgenologist. I shall first rehearse for you briefly the methods of x-ray examination of the colon, its structure, its anatomical divisions and the distribution of lymphatics and blood vessels throughout its length. Secondly, I shall discuss the types of carcinoma, their usual locations and how they may be recognized. Thirdly, I shall describe and differentiate carcinoma from the more common lesions of the colon. Finally I shall interpret the whole scope of our problem as viewed in the roentgen picture. Discussion of the rectum has been purposely excluded. It is my firm belief that the rectum can be much more accurately inspected by finger and proctoscope than by x-ray examination. From its anatomical location it cannot be properly palpated or visualized by the roentgenologist. the result is, that he constantly misses certain small tumors. Since twenty-five per cent. of the new growths of the colon are to be found in the rectum, the roentgen examination of this area should never be taken as final.

There are two methods of x-ray examination. The barium meal by mouth gives us a study of the movement of food through the colon. It will disclose obstructions or diverticula to a certain extent. By far the most satisfactory method, however, is the barium enema which shows us the complete filling of the colon with its internal outline when distended. This method finds constrictions and variations in shape. The x-ray, in either case is simply a shadow study which depicts the outline of the colonic cavity, its varying peristaltic movements and positions. One must appreciate that the variation from the normal must be of such a character that it will break the contour of the picture perceptibly.

The normal colon is a flexible tube, extending from the cecum to the rectum. The proximal end is the larger, diminishing in size from right to left toward the rectum: the sigmoid being the smallest. It has an outer serous coat, a circular, muscular coat and three longitudinal muscular bands, nearly equi-distantly placed about its circumference, which foreshorten it causing a pouched-like appearance or haustration. The colon is divided into the cecum starting in the right iliac fossa which is usually fixed, having a maximum movement of from two to three inches: the ascending colon which is slightly movable: the hepatic flexure which swings to the right forward and under the liver, partially fixed: the very mobile transverse colon which extends across the abdomen, upward to the left under the costal margin to the splenic flexure; the splenic flexure is more constantly fixed than

*Read before the Section of Surgery of the Massachusetts Medical Society at its Annual Meeting in Plymouth, June 18, 1930.

†Morrison—Roentgenologist, New England Deaconess Hospital. For record and address of author see "This Week's Issue", page 489.

the hepatic flexure; the descending limb of the colon is usually fixed and extends from the splenic flexure to the crest of the ileum; the pelvic colon loops back into the fossa, then forward dipping over the pelvic rim forming the sigmoid. It extends across to the right, then backward and downward to the recto-sigmoid junction, which is usually opposite the third sacral segment. Each of these segments may vary in length and position in different individuals.

The right colon and the hepatic flexure are usually accessible to palpation as well as the transverse colon. The splenic flexure may or may not be accessible to palpation as it is usually fixed high under the left costal arch. The descending colon is usually palpable. The pelvic colon and sigmoid may vary from eight to thirty-five inches in length and because of their position they are difficult to manipulate. In cases with a long ascending colon, the cecum may be mobile and sag well into the true pelvis, it is then non-palpable. The cecum seems to function somewhat like the stomach and it is in this right side of the colon that the function of assimilation of certain foods and the absorption of water takes place. The proximal colonic contents are liquid or semi-solid losing its fluid and becoming more solid in the distal colon.

Concerning the developmental and functional differences which influence certain types of non-malignant and malignant diseases of the large bowel, Rankin[1] in his "Surgery of the Colon" states, "Developmentally and functionally, the right and left divisions of the large bowel differ. From that portion of the primitive intestinal tube known as the mid-gut, the right half of the colon approximate to the middle of the transverse segment is developed, while the distal end evolves from the primitive hind-gut. Functionally, as Keith has pointed out, the cecum resembles a second stomach, and the right half of the large bowel simulates from this standpoint that portion of the small bowel which develops with it, while the true, large bowel function begins in the transverse colon, near the splenic flexure."

The lymphatics of the colon accompany the arterial supply with its various anastomoses. A certain few pass directly back through the mesenteric attachments. The cecum is more freely supplied than the splenic flexure or the descending colon. They are here more closely associated with the outer surface and are therefore more slowly involved in malignancy. The lymphatics of the transverse colon communicate with those of the superior mesenteric chain and those of the great omentum, thus indirectly with the stomach.

The blood supply is derived from two aortic branches, the superior and inferior mesenteric arteries. The proximal or primitive mid-gut receives its supply from the superior mesenteric artery, while the left colon is nourished by the inferior mesenteric artery. The blood supply is in the form of anastomosing arcades. The branches are given off and directly encircle the bowel wall from the mesentery to its free margin.

The late R. Walter Mills[2] in an article on "Studies of the Colon" says: "The difficult matter of an appreciation of a normal colon is necessary before we can reach conclusions: of its great variability in topography, form, length, tonus, contractural reactions and motility, and of its general relation as to such, to bodily habitus; that every static peculiarity of the individual finds its reflexion in the topography and form of the colon through resulting determination of abdominal regional capacities, proportions and distances; that all individual colonic peculiarities are influenced by the form, proportions, dimensions and pressure of the other organs of the abdomen, facts in turn true of every other abdominal viscus: and that the colon is individual in each person."

The opaque meal has its value in demonstrating motility and the position of the colon, showing certain lesion of the proximal colon especially inflammatory processes in the cecum and ascending colon (i.e., tuberculosis, abscess, certain types of carcinoma, gumma, etc.—the passage being more rapid than normal in these cases.) It also demonstrates diverticula and complete obstructions. It does not give the satisfactory picture of lesions or colon outline.

The barium enema, on the other hand, is more satisfactory. For this examination the patient should be properly prepared before being referred to the roentgenologist. Oil and a cleansing enema should be administered to purge the bowel of any hard fecal matter or coarse debris. In giving the enema we prefer to use a large rectal tube, having at least three openings. The barium mixture is made thin and the container is kept about twenty inches above the patient. The tube is inserted into the rectum just sufficiently to allow the eye of the tube to go through the internal sphincter. The filling of the colon should be watched through the fluoroscope. A normal colon does not fill as would a tube: but anti-peristaltic contractions, elongations of the longitudinal bands and movements of the circular muscles control the entrance. There is usually a temporary pause of the enema at the recto-sigmoid junction, again just distal to the splenic flexure, again distal to the hepatic flexure and in the ascending colon just distal to the ileo-cecal valve. Here the cecum seems to have a valve-like contraction, as it holds the chyme and mixes it before passing it onto the ascending colon. The fecal content of the colon is usually semi-solid well along to the sigmoid, except in constipation. In the ordinary short colon, one is able to watch the passage of the enema from the sigmoid to the cecum, through the fluoroscope, detecting any encroachment on the lumen or noticing any fixed areas. By pal-

PLATE 1. Normal adult colon with constipation, showing fecal material retained in the cecum.

pation, one can locate growths in the lumen of the colon which otherwise would not be recognized. They form palpable filling defects. The smaller encroachments may escape the radiologist, as there is no change in the outline of the colon. Often their position is such that no pressure defects nor encroachments on the lumen can be detected. If the peristalsis of the colon is normal, on withdrawing the enema through a tube of large lumen, contraction may take place

starting at the pole of the cecum, passing up the ascending colon, over the hepatic flexure, through the transverse colon, over the splenic flexure, down the descending colon and sigmoid to the rectum. This takes place generally by means of a mass movement. The proximal end of the moving mass being rounded off like a sausage. The haustral markings are here obliterated. The colon surrounding the mass appears perfectly smooth and at a certain distance along the colon there is an active spasm, so that the distal end of the mass movement becomes smooth like the proximal. As the proximal constriction or peristaltic waves move the bowel content along, the distal constriction releases and the waves move along maintaining a definite distance between. The mass movement in the colon is crowded toward the anus by the alternate contraction and expansion of the circular muscles consonant with those of the longitudinal muscles.

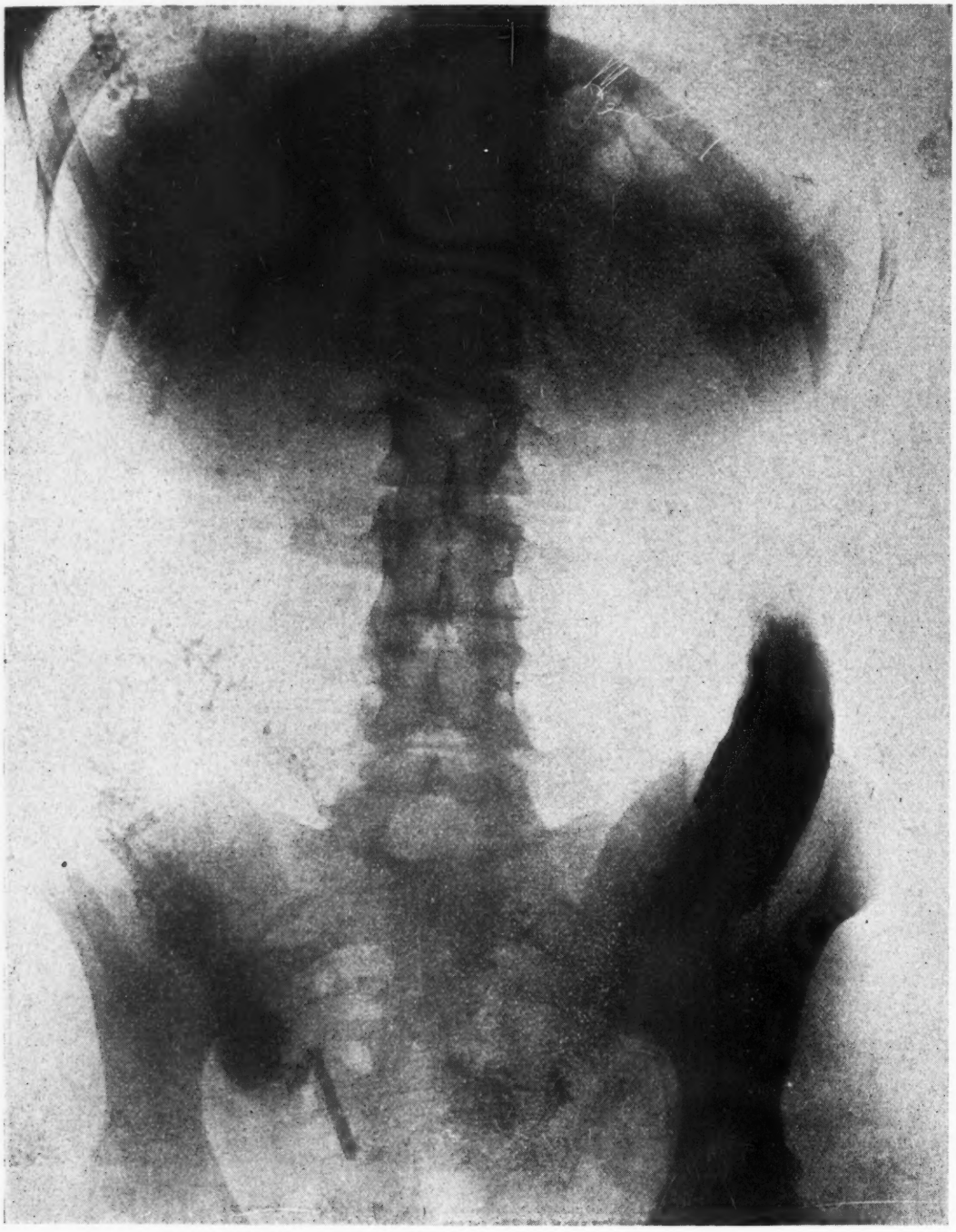

PLATE 2. Contracted state with haustral mass passing from cecum over to rectum.

The common types of carcinoma found in the

colon are the medullary, colloid and scirrhus or a combination of these. They are found most commonly in the male and may occur at any age although most commonly between the ages of fifty and sixty. The medullary and colloid type are of the ulcerating variety, and are found more

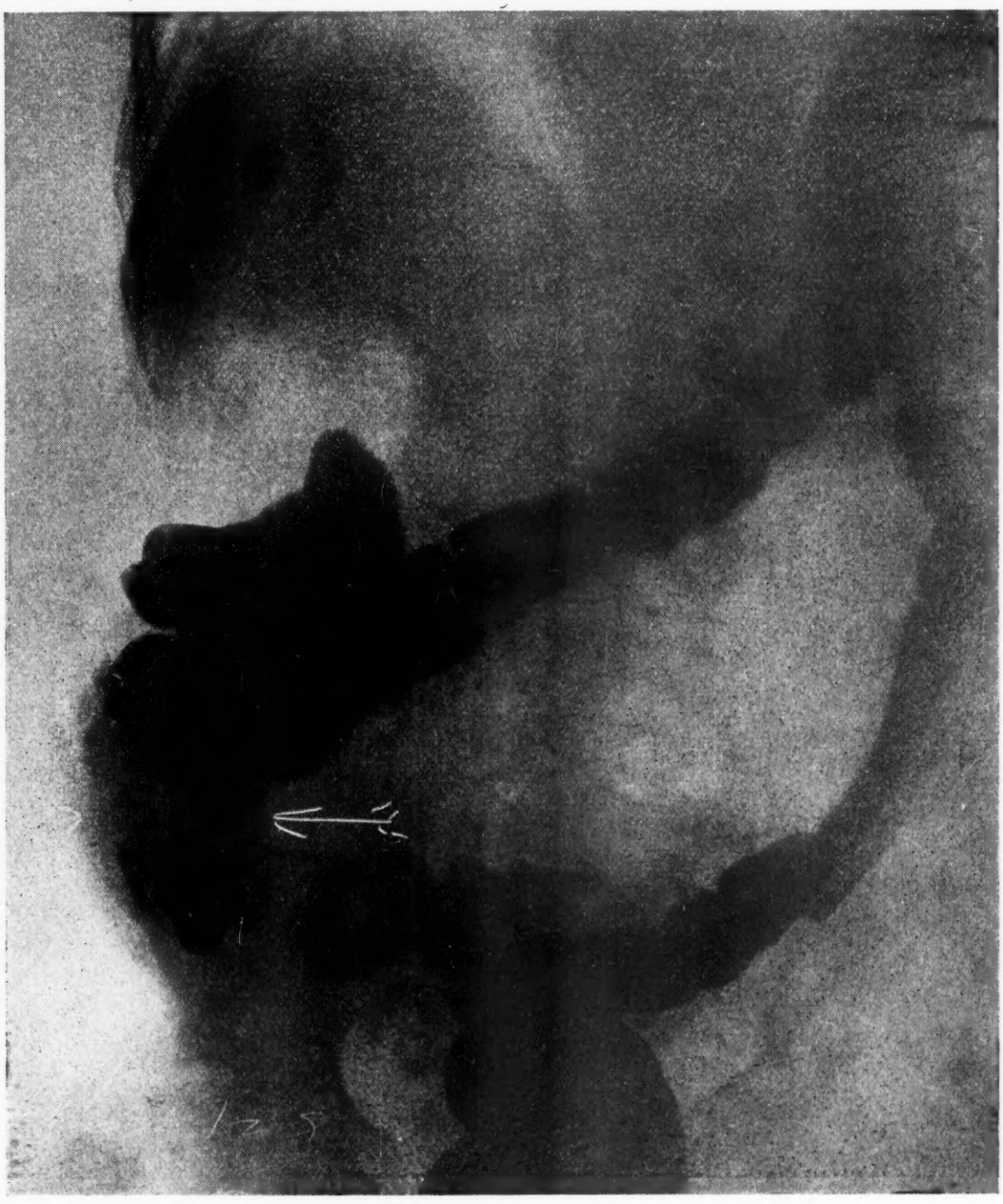

PLATE 3. Male: past 60. Indurated growth in cecum, disappeared. Patient regained weight following anti-specific treatment. Gumma.

frequently in the proximal colon. The scirrhous type is slow growing with a tendency to obstruct since it involves the whole lumen of the gut and is found most frequently in the flexures, the descending colon and the sigmoid. The cause of carcinoma is unknown, although it may develop following polyps, adenomata, diverticulitis or any irritative cause. It is usually of slow growth and nearly symptomless. The new growth forms a solitary, localized, sharply defined, fungating mass and may involve a considerable area of the bowel. The above mentioned soft cancers have little tendency to obstruct the lumen. In the scirrhous cancer, the infiltration is more restricted. It forms a ring-like mass surrounding the bowel; so that the intestine at this point is converted into a rigid tube. The intestinal surface ulcerates forming a shallow erosion and later metastases.

If one visualizes a colon with a disease working so insidiously that the function of the body takes care of the changing situation, until such

a time, when obstruction becomes imminent, then it can be understood how mild the symptoms may be and how alert the physician must be to recognize any change in the bowel habit, any increased peristalsis such as irritation would cause as indicated by a peculiar localized sensation from gas or more frequent evacuation of the bowels, accompanied by blood. The fecal matter from a lesion of the right colon is usually mixed with blood because the ulcerated variety is found there. In lesions of the left colon, blood in the fecal material is on the outside of the stool. The early scirrhous-carcinoma, while contracting the lumen, may not show blood until late.

Carcinoma of the large bowel tends to remain local. If it does spread, it does so by three routes:

1. By direct extension through tissue.
2. Through the venous system.
3. Through the lymphatic system.

Cancer occurs more commonly in the colon than in any other part of the alimentary tract with the exception of the stomach. It usually is of the less virulent types;

PLATE 4. Polyps in sigmoid, pain over pubes, abdominal in type. No induration. Lymphosarcoma.

Its rate of growth is comparatively slow as indicated by lymphatic invasion and remote liver metastasis.

The pre-cancerous stage is probably inherent in the simple intestinal adenomata.

Cancer of the colon is an adenocarcinoma. A crop of adenomata arises in small localized areas of epithelium.

The most common site of these adenomata of the large bowel is in the sigmoid.

The relative incidence of carcinoma as indicated by Saints' figures are:

Cecum	8
Ascending Colon	6
Transverse Colon	3
Descending Colon	5
Sigmoid Colon	20

tating growth plus irritating material increases peristalsis and may result in diarrhea. This is especially characteristic of cancer of the proximal colon. Colon irritability that comes on and persists especially in old people raises the suspicion of cancer.

We now consider other forms of colonic lesions with the features which distinguish them from

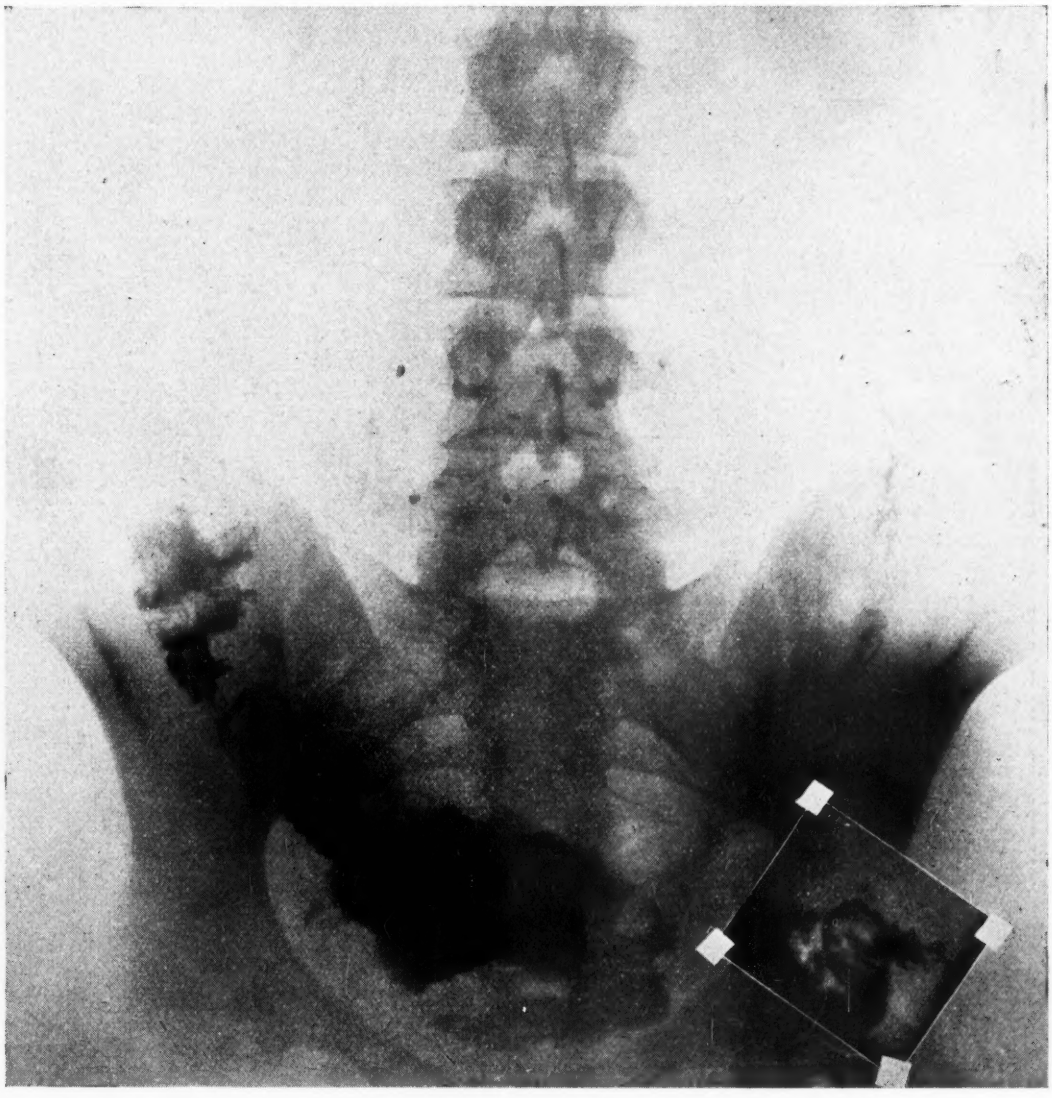

PLATE 5. Female: age 19. Hemorrhage from bowel five years. Diagnosis made by x-ray: polyps in low sigmoid beyond reach of proctoscope, proven by operation.

Cancer occurs in the colon in two main forms:

1. An ulcerating mass in the lumen of the bowel.

2. A constricting annular type with progressive narrowing of the lumen by a constriction process. These annular types represent about 25% of colonic carcinomas.

Both these types may cause obstruction and ulcerate although the latter ulcerates less often. The effects of ulceration are, in general, mucous secretions, blood and septic material. An irri-

carcinoma, as observed from the standpoint of the roentgenologist. In acute disease of the colon like colitis, the colon resists all passage of the enema and both reverse and normal peristalsis are exaggerated. The colon is small throughout its length. The haustral markings are only slight in depth or may be absent. This later is the case in acute colitis. The appearance gives one the impression of a thick-walled tube functioning poorly. There are no sharp angles, the flexures are strengthened and the longitudinal

muscles seem to be contracting as well as the circular which are in a state of semi-contraction. The clinical symptoms are those of pain, tenderness, with frequent movements showing blood and pus in proportion to the severity of the lesion. Slight ulcerations may show on the lumen and there is an appearance of rigidity as the colon empties, giving the impression of a sensitive colon. Using only a small amount of barium solution, the enema may pass over the cecum readily or on the other hand very little of the solution may pass.

PLATE 6. Female in cancer age. Carcinoma in descending colon on level with crest of the ileum. No symptoms. Patient sent in just to be looked over.

The picture of carcinoma of the colon from the x-ray standpoint is different. Here the cause is local instead of general. Usually the growth is so slow in developing that the bowel overcomes the very slight inconvenience and accommodates itself to meet the slowly changing situation of disturbed function. This is manifested by the slowness of dilatation of that portion of the colon proximal to the lesion. The peristaltic action is retarded and stasis is increased. This is indicated by the large amount of gas and fecal material, scybalous in type, which is the result of absorption of the fluid contents. Distal to the lesion, we find a more normal appearing colon with the absence of scybalae. The enema meets obstruction at the site of the lesion in the distal end of the colon or may show a massive filling defect depending on the type of growth.

Chronic constipation differs from carcinoma in that the dilatation may be more irregular throughout the colon. The haustral markings are less deep, particularly in the later stages. Both the longitudinal and circular muscles throughout the colon are stretched to capacity and function poorly. There is much gas, fecal material is scybalous in type and is found from

the cecum to rectum. The bowel fills the abdomen. The symptoms are similar in carcinoma but of much longer standing. As the enema passes over to the cecum, it seems to dodge in and out around the scybalae without much hesitancy or discomfort to the patient, reminding one of the cutting in and out of a Ford on Commonwealth Avenue in the rush hour.

In diverticulitis, 75% of the cases of which are located in the sigmoid, there is a more decided picture of an acute or semi-acute abdominal lesion of rather rapid onset. The proximal portion of the colon is seen to be dilated. The distal half of the transverse colon is less dilated as is the descending colon proximal to the lesion. This portion usually contains scybalae. This accounts for the tenderness and painful condition in the lower left quadrant with desire of frequent stool, the presence of indigestion and the absence of blood; the haustral convolutions, instead of being opposite, alternate on either side of the bowel. Secondary irritative indentures appear in between. Later more wedge-shaped haustrations occur. The barium meal shows diverticulitis rarely except on the fourth or fifth day after its inception. The enema is diagnostic; however, the differential diagnoses are:

1. Diverticuli are present at or near the deformity—which is not generally true of cancer.
2. Characteristic deformity is always present while the deformity in cancer depends on the type of the growth—ring, ulcerating or papilloma type.
3. Diverticulitis is usually over a large area while carcinoma is limited. One must never lose sight of the possibilities of carcinoma accompanying diverticulitis in another part of the body or even engrafted on a diverticulitis.

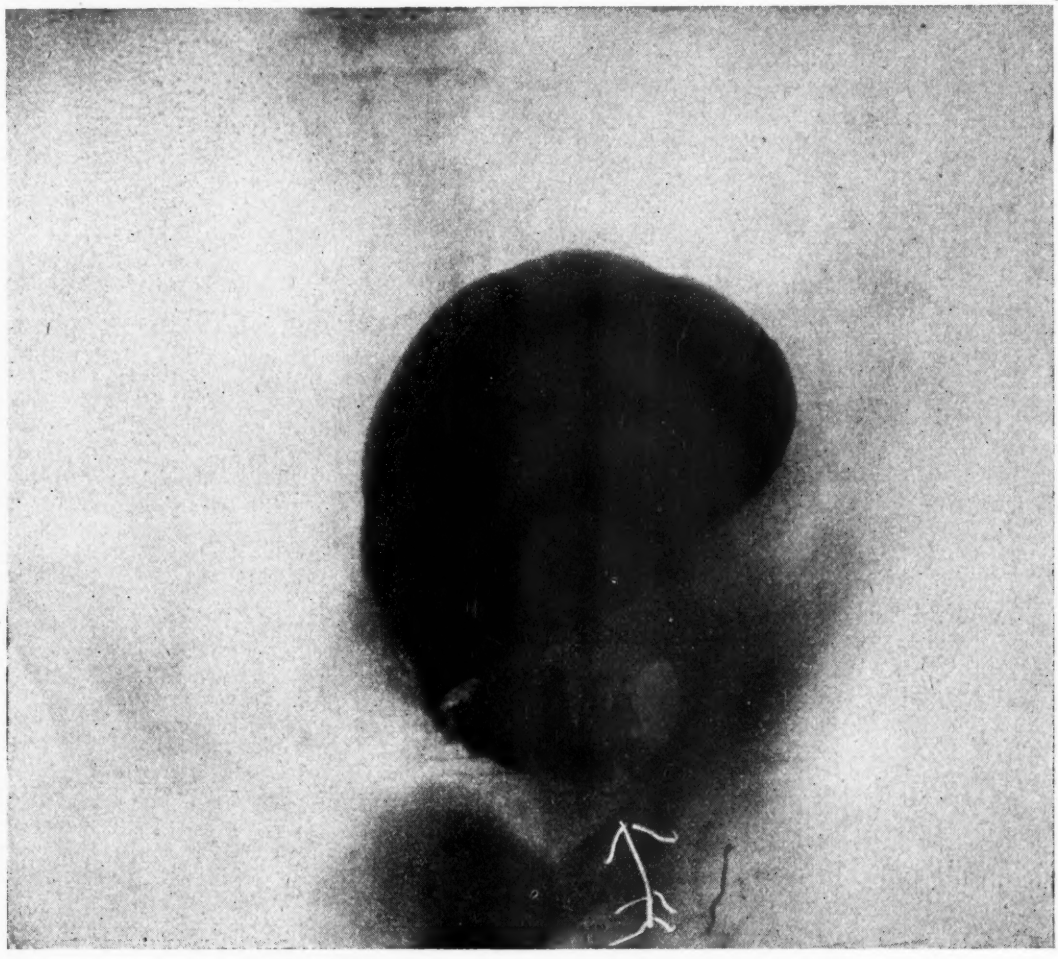

PLATE 7. Male in cancer age. Diverticulitis of the pelvic colon with an obstructing carcinoma.

There are two varieties of malignant obstruction:

1. The sudden acute.
2. A slower chronic obstruction where the colon is dilated, filled with fecal material and the patient toxemic.

The rapidity of growth varies. The sudden acute develop rapidly and disseminate early: only months intervene before the growth obstructs, differing from the years taken by the slow type.

Abscesses from appendicitis must often be differentiated from carcinoma. The case history should be the deciding feature.

Tuberculosis of the colon can be differentiated by careful study of the history, the barium meal and the enema. Although carcinoma in the cecum near the ileo-cecal valve will at times give the same picture as seen in tuberculosis, i.e., the rapid emptying of the involved area.

Gumma must be considered occasionally. These deformities are similar to carcinoma and so are their general symptoms. The Wassermann test and treatment, with an x-ray examination a little later will give a correct diagnosis.

PLATE 8. Patient past 50. Symptoms duodenal ulcer. Shows a small growth in the descending colon.

Actinomycosis may occasionally resemble malignancy. However, the locating of spores and the case history will be deciding factors.

The textbook symptoms of carcinoma which aid in diagnosis are:

1. Cachexia and loss of weight are more prev-

alent in the ulcerated type of carcinoma which is most common in the ascending colon. They are, however, characteristic of all types of carcinoma. Loss of appetite is an indirect cause.

2. Anemia due to loss of blood is very characteristic. This secondary anemia is more noticeable due to ulceration. This is seen especially in proximal colon cancer.

3. Bleeding may be caused by carcinoma; but polyps, ulcerative colitis (infected type of tuberculosis), hemorrhoids and diverticulitis (acute, rare in chronic) are causes of bleeding to be differentiated.

4. The obstructing lesion by narrowing the lumen delays the fecal stream causing hypertrophy of the bowel above the lesion with more vigorous peristalsis causing pain, rumblings or borborygmi. The symptoms are made worse by taking food or purgatives. These early symptoms may be ascribed to dyspepsia. Later, dilatation of the colon proximal to the lesion takes place.

5. Pain in the cecum is usually caused by distention.

6. Obstruction of the cecum causing back pressure in the ileum may cause epigastric pains.

PLATE 9. Fourteen months later shows the size of the carcinoma.

7. Obstruction in the sigmoid causes pain above the pubes.

8. Ribbon stools are not characteristic. They may be due to a spastic sigmoid and rectum.

9. Pain is not a prominent symptom until late in the disease. It is colicky in character and due to obstruction.

Unfortunately most of these symptoms occur only late in the development of malignancy.

There are certain symptoms which aid in locating the malignancy in a specific division of the colon and aid in determining its type:

ulcerating type or of the annular type. The tumor is mobile. Gastric complications of dyspeptic type are not uncommon.

3. *Splenic Flexure:* Here the carcinoma is generally of the annular type. Obstruction of nearly 100% is frequently noted.

4. *Descending Colon and Sigmoid:*—Carcinoma of the descending colon and sigmoid is generally of the annular type but may be caused, especially those in the sigmoid, by a degeneration of a polyp or a localized adenomata.

The reason for the slowness of growth and

PLATE 10. Ulcerated type of carcinoma in the cecum.

1. *The Cecum:*—The majority of carcinomas of the cecum and of the ascending colon are of the ulcerating type. They usually begin in the wall of the vessels and do not obstruct the lumen until a later stage. Consequently the barium meal passes through readily. When the growth is in the cecum, especially near the ileo cecal valve, rapid passage of the six hour meal is observed. The proximal colon tumor situated most frequently at the caeco colic junction is usually palpable. Obstruction is rare because the contents of the bowel here is fluid.

2. *Transverse Colon:*—Obstructions in this portion of the colon come late in the course of the growth. Carcinoma may be either of the

symptomless condition of the proximal portion of the colon is the fluidity of the food passing through this portion. The mixing process continues in the cecum and, with the absorption of the watery portion, the content becomes semisolid by the time it has reached the transverse colon. This absorption of fluid continues as the bowel content proceeds to the distal portion of the colon. At the splenic flexure and in the distal colon it has become rather solid and consequently is more liable to obstruct. Furthermore, growths in these locations are more likely to be stimulated to a more rapid development for this same reason. Constipation is another factor in the stimulation of growths. Most

carcinomas are found in patients past fifty years of age at a time of life when constipation is prevalent.

A great majority of cases come to the x-ray examination after a partial obstruction has taken place and in this condition a significant observation in the examination is that the bowel proximal to the lesion is filled with large masses of

PLATE 11. Male: age 70. History of bleeding twenty-one months. Diagnosis by x-ray: two ulcerating carcinoma from polyps in pelvic colon, confirmed by operation.

fecal material and somewhat distended with gas. The bowel, distal to the lesion, is usually practically empty, the patient having had a number of small but frequent movements. The patient may complain of recurrent attacks of diarrhea in which the amount of the movement is very unsatisfactory. There may be uneasiness of the bowel without pain at these times.

A quite complete and careful record of the last 102 cases of carcinoma of the colon discovered at the New England Deaconess and the Palmer Memorial Hospital (both of Boston), furnish some interesting statistics. Ten cases reported none of the symptoms generally attributed to malignancy. Eight cases had incomplete early histories. Among the remaining eighty-four cases, pain seems to have been the most common symptom. It was reported in sixty-three cases. Loss of weight came next with thirty-five cases showing it. Bleeding was indicative in twenty-eight of the eighty-four cases only.

The most common site of a growth of the colon as indicated by these cases, is the sigmoid, fifty-five cases were found in this part of the colon, fifteen in the cecum, twelve in the transverse colon and the remainder were scattered throughout the other divisions.

The duration of symptoms before the diagnosis was established is rather striking. In forty-

six cases found in men the average duration was 7.6 months: while the same number found in women showed an average duration of 8.7 months.

The size of the tumor, as judged by either the roentgenogram or the operative description emphasizes again the need of careful attention to examination and history. A growth of 6.8 c.m. was the average of twenty-five cases in men. The average involved area of thirty-four cases in women was 5.6 c.m.

PLATE 12. Ulcerating carcinoma in pelvic colon, history of bleeding.

To continue below a 10% failure in x-ray diagnosis, the roentgenologist should be given a complete history of the patient in suspicion by his physician. Proper preparation of the patient for the examination, i.e., oil and enema: is imperative. Repeated examinations should be made if necessary to prove positively the presence or absence of the tumor in the roentgenogram. Even with negative reports from x-ray examinations, the physician should never rest satisfied so long as the patient in the cancer age shows continued symptoms compatible with cancer. Should the symptoms persist after a short period of treatment, a second examination should be made and in this way a growth may be detected.

It cannot be overemphasized that the roentgenogram cannot be depended upon to show more than the colonic outline. The growth is indicated for diagnosis by a constant defect formed at a certain point in the outline of the working colon by palpation or otherwise. Furthermore the growth must be in such a position and of sufficient size that the roentgenologist can visualize it.

In my opinion the Roentgen examination is the most satisfactory and competent aid in the

diagnosing of carcinoma of the colon. Earlier diagnosis will result from more careful coöperation of the physician with the roentgenologist and surgeon.

CHART I

INCIDENCE OF CARCINOMA OF COLON AT N. E. D. H. AND P. M. H.

Age in Years	Men	Women	Total
20-29	0	3	3
30-39	1	1	2
40-49	4	6	10
50-59	21	17	38
60-69	19	15	34
70-79	5	10	15
	50	52	102

CHART II

CARCINOMA OF COLON

Symptoms

	Present	Absent
Bleeding	28	56
Loss of weight	35	49
Pain	63	21
None of these symptoms	10	
Incomplete history	7	

CHART III

CARCINOMA OF COLON

Cecum	15
Ascending colon	7
Hepatic flexure	6
Transverse colon	12
Splenic flexure	3
Descending colon	3
Sigmoid	55
Location not given	1

CHART IV

CARCINOMA OF COLON

Diagnosis Made

	Cases
Clinically	61
Confirmed by x-ray	22
Roentgenologically	24
By exploratory laparotomy	6
Incomplete history	10

Duration of Symptoms

Men		Women	
46 cases	7.6 months	46 cases	8.7 months
		1 case with constipation and other vague abdominal symptoms of seven years' duration not included.	

Size of Tumor

Men		Women	
25 cases	6.8 c.m.	34 cases	5.6 c.m.

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CHAIRMAN WALKER: The next paper is "The Diagnosis and Principles of Treatment of Carcinoma of the Colon," by Dr. E. P. Richardson, of Boston.

THE DIAGNOSIS AND PRINCIPLES OF TREATMENT OF CARCINOMA OF THE COLON*

BY EDWARD P. RICHARDSON, M.D.†

ONE'S impressions in regard to carcinoma of the colon can most definitely be given by imagining that one is condemned to carcinoma within the abdomen, but free to choose the organ affected by it. In my own case I should have little doubt. My choice would lie between carcinoma of the colon and carcinoma of the rectum. My hesitancy would depend on the nature of the operation demanded. For an individual who is observant of slight abnormalities and who will promptly consult a doctor sure to carry out a thorough examination, carcinoma of the rectum presents perhaps the greatest chance of early diagnosis and of final cure. But for cure to be probable, a complete removal of the rectum with a permanent colostomy seems to me essential. In carcinoma of the colon, diagnosis is unlikely to be made as early, but the growth often develops slowly and tends to remain local for a considerable period of time. Consequently it may be curable when diagnosed, and when removable can usually be excised without necessity for a permanent artificial anus. Against this latter advantage may be set a somewhat higher operative mortality than in cancer of the rectum. However, if I could choose the exact site I should probably choose the sigmoid flexure, in part on account of its anatomical arrangement favoring complete removal, including the area receiving lymphatic drainage, in part because subsequent anastomosis is ordinarily possible, and in part because of the more conspicuous symptoms arising in a segment of the intestinal canal dealing with solid faeces.

For intra-abdominal cancer to be recognized in an operable stage, there are various requisites. The first is chiefly anatomical, and demands that a growth arise in such a situation that it can extend for a time without invasion of structures which are impossible to remove by surgery. The second is relative absence of the tendency to distant invasion, whether through the lymphatics, the blood stream, or through peritoneal implantation. From clinical and pathological

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†Richardson—John Homans Professor of Surgery, Harvard Medical School. For record and address of author see "This Week's Issue", page 489.

experience, we know that cancer in certain situations kills in large part through distant invasion; in others even at death the growth remains essentially local, although invading structures which cannot be excised. The reason does not concern us here, whether it lies in the tumor itself or in the blood supply and lymphatic drainage of the viscus affected.

For the importance of anatomical situation, we have only to contrast carcinoma of the uterine fundus with carcinoma of the pancreas. In one case the tumor starts in the lining membrane of a thick muscular organ, readily removable with a margin of surrounding tissue; in the other, it invades structures so important long before diagnosis can be made that removal can hardly ever be undertaken.

For the second point, tendency to extend to a distance, we may compare carcinoma of the stomach with carcinoma of the colon. In both cases the peritoneal relations of the organ are essentially similar, the thickness of the wall of the viscus apparently affords a barrier not greatly different to a tumor starting in the mucous membrane, yet in cancer of the stomach there is early invasion of the regional lymphatics, and frequent extension to the liver, while cancer of the colon, if inoperable, is more likely to be so on account of invasion of contiguous structures, than on account of extension to a distance.

The third requisite for recognition of intra-abdominal cancer in the operable stage, is conspicuousness of symptoms. In general we can say that the early evidence of intra-abdominal cancer may be pain, a tumor mass, or hemorrhage. Pain, during the early stages, is essentially obstructive pain, and may be associated with other evidences of partial obstruction, vomiting, distention, visible peristalsis, obstipation or diarrhoea.

Carcinoma of the colon not only progresses slowly in most instances, but frequently, particularly when affecting the left colon, is a constricting type of lesion. Under these circumstances, obstructive symptoms are likely to occur. The patient is fortunate who has definite pain. He can hardly escape demanding medical advice. On the other hand, a lesion producing a tumor is not readily observed by the patient until it causes obstruction of some type, or extends so far as to produce the second type of pain from cancer, that from pressure on or invasion of nerves, a symptom often signifying inoperability. A tumor involving the gastro-intestinal tract, as it advances peripherally, may slough within, so that obstructive pain is not produced. Haemorrhage must be obvious and repeated to lead the average patient to consult a physician. Occult bleeding, appreciated by the patient and his friends only as increasing pallor and weakness may continue unobserved for too long to be a useful symptom during the operable stage.

To illustrate the value of mechanical block in the production of positive symptoms I shall refer again to cancer of the stomach. Operable cancer in the stomach in my experience almost always occurs near the pylorus. Here the diameter of the lumen of the stomach is not great, and a growth will not progress far without causing some obstruction. On the other hand, a tumor involving the body of the stomach, where the diameter is so great that mechanical interference does not occur, progresses silently so far as to be almost always inoperable when first diagnosed even by the most alert physician.

These good features of cancer of the colon, the tendency to remain local, the accessibility of the regional lymphatics, the slow growth and the frequent presence of definite symptoms, obstructive in character, are stressed, because together they make the most favorable type of intra-abdominal cancer for cure common to both sexes. Conviction as to the curability of a disease is the most important basis for earnest efforts in diagnosis.

We are trying to diagnose, therefore, a lesion which is always ulcerated when recognized, and which frequently blocks, to a greater or less extent, the progress of intestinal contents. The clinical picture tends to differ according to the part of the colon involved. If we divide the colon at the middle of its transverse part into right and left halves, obstructive symptoms will be more frequent in tumors of the left half, including the sigmoid, and the pelvic colon, than of the right half, including the caecum. The usual story is that of a change in bowel habit, accompanied by some abdominal discomfort, a sense of fulness accompanied by a grumbling, or an occasional sharp colicky pain. Usually constipation is increased. Occasionally there may be more persistent pain, recurring as waves of peristalsis arise, sometimes ending with an appreciable gurgle of gas and fluid. When from the large intestine only, the pain is characteristically felt in the median line, between the umbilicus and the symphysis. In this stage of the disease, thorough examination is particularly important. The more skilful the medical treatment, through diet and mineral oil, the longer will further progression of symptoms and consequently a final diagnosis be delayed. The fortunate man here is the hearty eater, careless of his bowels. With him the discomfort soon becomes so intolerable as to be taken seriously.

Clear-cut obstruction may develop, rarely without premonitory symptoms, more commonly as an intensification of previous discomfort. Almost half of the cases show either an actual obstruction on admission to the hospital, or else an unmistakable history of it. Obstruction is no sign of inoperability. The cause is often found to be a small spool-like tumor, almost without lymphatic involvement, favorable for cure. These obstructive lesions, usually of the

left colon, do not often show a palpable tumor. This finding is more common in the right colon, partly because it is more accessible to palpation, and partly because the growth, although less constricting, is more productive in type.

Massive hemorrhages are infrequent. The bleeding is usually moderate in amount, and is usually not altered by digestion, although it may be so in cancer of the ascending colon and caecum. Occult blood, on chemical test, is a common finding, very important in leading the physician to realize that he may be dealing with an organic ulcerated lesion. During the period of hospital study, every stool should go to the laboratory for this purpose. From the patient's point of view, rectal bleeding is less conspicuous than in cancer of the rectum. However, brownish blood stained mucus is often found, and may be observed in the stools, or on proctoscopic examination.

Alterations of bowel habit toward constipation has already been spoken of. In a few cases this may take the form of diarrhoea. This change occurs because faecal matter, dammed back by a narrow stricture, tends to remain liquid, a provision of nature presumably due to an irritating effect. If it is passed without being dried out again, the result is a diarrhoea. The patient's statement should not be taken in regard to constipation. The actual number of bowel movements day and night should be asked. Occasionally the patient may say he is constipated on account of a lack of a sense of relief after movements, when actually he is having six or eight a day.

Certain deceptive types of cancer of the colon keep turning up. The first is the case that simulates colitis, on account of diarrhoea with blood and mucus. Here the distinction lies in a normal recto-sigmoid mucosa on proctoscopy, and an obstructive filling defect on examination with a barium enema. Appendicitis may be simulated, both the chronic type and the subacute type with abscess formation, the latter because a slowly developing inflammatory mass is easily confused with a neoplasm. Caecal distention secondary to an obstruction of the left colon may lead to right-sided pain, and consequently to appendectomy. I have found such a growth still operable one year after appendectomy for this reason. I believe that except in a few young individuals the abdomen should be explored with the whole hand when operation is undertaken on the diagnosis of a chronic or recurrent appendicitis. Finally, in certain profound anemias, cancer of the right colon should be thought of, as well as cancer of the stomach and primary anemia.

We have available the methods necessary for a final diagnosis, if cancer of the colon is once seriously thought of. As cases present themselves clinically, cancer of the rectum gives a similar diagnostic problem. The only difference in the history is the rarer occurrence of obstructive abdominal symptoms, if the growth is below the level of the peritoneum, and a greater predominance of rectal symptoms; bleeding and tenesmus, with perhaps incontinence, if the rectal sphincter is involved. I should put first, therefore, rectal examination with the finger, and believe that the knack of painless and complete examination of the rectum is an extremely valuable one to acquire. I am accustomed to examine patients in two positions, and to demand a fatty rather than a mucoid lubricant. The first position is the left lateral one with the thighs and knees flexed. Using the right hand and directing the patient to strain, it is possible to reach higher in this position than in any other. The second is in the dorsal position. Here I am not trying so much to reach a lesion within the lumen of the bowel, as trying to find, by bimanual examination, a tumor in the pelvis.

The next method is proctoscopy in the knee-chest position, passing the instrument by direct vision after gentle inflation. In most individuals it is possible to reach the brim of the pelvis or higher. Thus one can exclude a lesion of the part of the colon most difficult to be certain of on x-ray examination, or make on a first visit, a positive diagnosis which otherwise might be indefinitely postponed waiting for barium enema. One can detect the presence or absence of bloody mucus from higher up or of the lesions of ulcerative colitis in the recto-sigmoid, their most constant location, the importance of which has already been mentioned.

The x-ray in good hands is a reliable method of diagnosis, if the patient is well prepared and the lesion higher than the rectum or pelvic colon. Examination should be by barium enema, since lesions of the colon are readily overlooked if barium is given by mouth alone. The most definite evidence is obstruction to filling of the colon beyond the lesion, a finding rarely observed in any other condition. The other common evidence, a filling defect, may be simulated by various things. In general we should use x-ray to supplement other clinical findings, and not rely on it alone either to make the diagnosis, or to exclude the presence of cancer.

For advantage to be taken of the favorable aspects of cancer of the colon just mentioned, there are two needs. The first is more prompt diagnosis. I believe that I can see an advance in this respect and that we can expect a further slow improvement. The second, a reduction of operative mortality, concerns us more directly as surgeons. It is clear that this is higher than it might be, and seems the line along which the most immediate progress may be made. Consequently it appears desirable to review certain principles of operative treatment.

Treatment is by surgical excision, when possible. Since these patients are often obstructed, dehydrated, partly starved, or anemic, measures preliminary to operation are often advisable.

Where these aim at restoring the patient's general condition, such as infusion of salt solution, glucose, and perhaps transfusion, they are eminently desirable. Few cases are so urgently obstructed that there is not time for some of these measures. Where the aim is emptying and cleansing the intestinal tract, I have more question. It requires great skill to obtain a satisfactory result, and to avoid making the patient a worse risk than before.

Universal experience has shown that it is unsafe to do a radical excision of a tumor of the colon when the bowel is obstructed. Yet the obstruction must be relieved. If not, it is commonly felt that the only danger comes from the immediate effects of the obstruction. I have been more and more struck with another danger, that of necrosis of the caecum from overdistention. Rupture may occur when the patient is apparently tolerating his obstruction well, and he is overwhelmed by the escape of a large amount of liquid faeces into the peritoneal cavity.

The dangers can be avoided by a preliminary caecostomy, or in the few cases of obstructive lesions near the ileocaecal valve, a left-sided ileostomy. There is no reason to assume the risky uncertainties of attempting to clear out the colon through the natural route. If the caecostomy is done through a three-quarter inch tube, complete relief of the obstruction is provided with two further advantages, first an opportunity to clean out the colon, and second a vent to relieve overdistention and tension on the suture line after resection and anastomosis is done.

With regard to the resection itself, there is only one operation which seems fully established in its details. I refer to excision of the right colon, including a few inches of the terminal ileum and of the transverse colon, for a growth situated anywhere in the area included from the hepatic flexure to the caecum. This operation removes the growth, and its lymphatic drainage, and leaves an anastomosis which has a good blood supply, and deals with liquid feces. The operation can be carried out in one stage, does not require drainage, and although a severe one, is ordinarily well tolerated.

For growths situated elsewhere in the colon, operation seems to me less definitely standardized, and I shall refer to principles only. One has been mentioned already, that of preliminary drainage to empty the bowel, a procedure which also serves to lessen distention and pressure on the suture line by providing a vent above after operation. A second principle is that of mobilization. Before resection, by whatever method, if the colon is not found free, the embryonic condition of mobility should be restored by dividing the outer peritoneal attachment, and lifting up the colon with its blood supply from the posterior abdominal wall. This measure avoids tension on the suture line, of fundamental importance if leakage is to be avoided. Together with this goes the establishment of the blood supply of the colon actually present in the individual case. Leakage from the suture line occurs from impaired blood supply rather than from technical defect in the suture. If the colon is thoroughly freed, a considerable length of colon can often be removed with better hope of union without leakage and of cure than a short segment. This means that the lines of section of the colon can be chosen so that neither limb of the anastomosis is without an active blood supply. Even with this precaution, I do not believe that the suture line can be relied on to hold, where large bowel is joined to large bowel, and therefore, although drainage encourages leakage, I believe that the anastomosis should be thoroughly drained.

In every case we have the decision whether or not to do a formal resection and anastomosis. If the growth is so low in the colon, that a short pelvic stump is left, I believe that excision of the growth, closure of the pelvic stump, and colostomy is preferable to a dangerous anastomosis. If the growth can be rendered so mobile that it can be pulled outside the wound with its mesentery, I believe that a multiple stage operation, of the type of the Mikulicz-Paul procedure, is the safest. The first stage only needs to be done under general or spinal anaesthesia. Cutting off the growth flush with the abdominal wall, the crushing of the intervening spur between the two limbs of bowel, and finally the closure of the resultant fistula, can be done either without anaesthesia, or by means of local infiltration.

To sum up, I should say first that cancer of the colon, whether obstructed or not, is a favorable type for cure and that our principal difficulty in securing better results does not lie in inoperability, but in operative mortality. As a help in reducing this mortality, I would stress certain principles of treatment, drainage of the bowel to overcome obstruction, thorough mobilization of the colon before resection, care in preservation of the blood supply, drainage of the suture line, and under certain circumstances avoidance of resection and immediate anastomosis through exteriorization of the growth before resection, or occasionally, a permanent colostomy.

CHAIRMAN WALKER: The subject of the next paper is the "Relation of Diverticulitis of the Colon to Cancer," which will be reviewed by Dr. Daniel F. Jones, of Boston.

DIVERTICULITIS OF THE COLON

Its Relation to Carcinoma*

BY DANIEL F. JONES, M.D.†

IN the title of this paper I have used the term diverticulitis because that is the condition we wish to discuss. It has been used for years to cover all conditions in which diverticula are present, largely because only those conditions were noticed in which an inflammatory process was present.

We know today that there are many cases in which diverticula are present without inflammation and without symptoms. Spriggs[1] suggested some six or eight years ago the term diverticulosis to cover all conditions in which diverticula are present, and reserved the term diverticulitis for those conditions in which there is an inflammatory process. So far as we are concerned, diverticulitis is applied to those conditions which cause symptoms. Uncomplicated diverticulosis, it is generally admitted, does not cause symptoms.

Nothnagel in his System of Medicine, 1904 edition, says: "Of late years special attention has been directed to the interesting question of pathogenesis of these diverticula. As these lesions are chiefly of anatomic interest, and have very little clinical significance, only a few general remarks will be made on the question."

Spriggs and Marxer[2] state that the first report of diverticulitis of the colon was made in 1815 by Fleischman, but a more complete report was made by Cruveilhier in 1849. Little attention was paid to the condition until the beginning of the present century. In 1898 Graser[3] showed that these cases were not uncommon and were of great importance. In 1904 we were given a paper by Beer[4] on the etiology and classification and this was followed by papers from Telling, Drummond, Spriggs, and many others. It is interesting that a condition which occurs in about 5% of individuals did not attract the attention of medical men and surgeons until thirty years ago, and has not occupied the position it deserves for more than fifteen years. The first case of diverticulitis appears in the records of the Massachusetts General Hospital in 1911, and that diagnosis was changed to carcinoma within three months. There were two other cases reported that year. In 1929 there were twenty cases reported. My first case was operated upon in 1905, but a definite diagnosis was not made for nearly a year after that.

The frequency of occurrence of these cases is very difficult to determine. If we examine the autopsy records from 1900 to 1917, very few cases will be found, for there was no interest in diverticulosis and very little in diverticulitis. Giffin[5], quoting Gordinier and Sampson, states that various series of autopsy reports gave the occurrence of diverticulitis as varying from eight-tenths of one per cent. to four hundredths of one per cent. In certain communities in which an interest is taken by the pathologist and roentgenologist a surprisingly high percentage of cases of diverticulitis and diverticulosis will be reported. W. J. Mayo[6] reports in 1929 that Robertson found diverticulosis at autopsy in 5% of persons over forty years of age and x-ray records of 26699 examinations showed diverticulitis in 5.89%. Spriggs and Marxer report diverticulosis in 8.3% of all patients who had gastro-intestinal x-ray examinations. It is probable that from 12% to 15% of the cases of diverticulosis show diverticulitis.

The cause and method of production of diverticula is still unsolved. Because the great majority of diverticula appear in those over forty years of age, they are called acquired, and as they do not include all layers of the bowel in their walls, they are called false. Those which are definite pouches of the bowel wall and contain all its layers are true, and as these are present in all ages, they are said to be congenital. After looking over the literature on the subject it seems more than likely that there is some congenital weakness of the bowel wall, either an irregular distribution or thinning of the circular muscular fibers, or unusually large openings about the perforating vessels leaving an area of weakness similar to that about structures emerging from the abdominal cavity. A group of cases suggesting some congenital condition is that of a family of four, a father and three sons, all of whom have diverticulitis. Two of these patients have already been operated upon.

There is little to be gained by considering the conditions generally given as the causes of diverticulitis, constipation, obesity, venous stasis, infection, and others, as there is little evidence of any value that they have any relation whatever. Constipation is often spoken of as a cause and the statement made that it increases intracolonic pressure, while there is reason to believe that there is a lowered intracolonic pressure in constipation. Obesity may be present, but statistics show that the average weight of these patients is no greater than that of the average individual.

There are no symptoms referable to simple diverticulosis. The symptoms of diverticulitis are those of an inflammatory process in the left lower quadrant, in a large proportion of cases, but the inflammatory process may rarely occur

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†Jones—Consulting Surgeon, Massachusetts General Hospital and New England Deaconess Hospital. For record and address of author see "This Week's Issue", page 489.

at other points along the colon. I have seen but one case which required operative interference above the upper end of the sigmoid. The single exception was an abscess about a single diverticulum on the posterior aspect of the cecum. The most important symptoms in addition to those of an inflammatory process are those of obstruction, usually with a mass to be made out in the left lower quadrant or in the left side of the pelvis. At times diverticulitis causes bladder symptoms due to the irritation of the bladder wall by the inflammatory process, or because of a fistula between a diverticulum and the bladder. Rupture of a diverticulum may cause an abscess in the mesentery or outside of it, or it may cause a general peritonitis by a rupture of a diverticulum or abscess into the general peritoneal cavity. This is a rare occurrence, because adhesions usually form about the diverticulum before rupture. In a great majority of cases there is a peridiverticulitis which causes a thickening of the intestinal wall and surrounding tissue which may go on to cause partial or complete obstruction.

One of the two reasons for this paper is to determine the importance of bleeding associated with diverticulitis. It is, I believe, a very important factor to consider in diagnosis. It seems to be generally recognized that diverticulitis may cause bleeding, but as this is an important symptom in the diagnosis of cancer of the colon, it is necessary to estimate its importance in diverticulitis. Spriggs[7] states that bleeding occurred three times in fifty-eight cases of diverticulitis, that is 5%, while Rankin[8] states that it occurred thirty-nine times in two hundred and twenty-seven cases, that is 17%, but states that "blood was seen to originate in the anal region usually." He also says that the proctoscope demonstrated the blood coming from above the anal canal in twenty cases, that is 9% of the total number. In these cases with a tumefaction present malignant disease was suspected in all, but found in only one. He then says that while bleeding is not commonly found among the symptoms of uncomplicated diverticulitis or diverticulosis, when it does occur, an associated malignant condition is always suspected but frequently not found. This may be true in certain clinics because of the accuracy of the roentgenological examinations, but it is very doubtful if it is true when the examination is made by the average roentgenologist. Differential diagnosis between carcinoma and diverticulitis depends very largely upon the x-ray examination, and I have no hesitation in saying that the error is quite considerable. The value of the presence of blood in the stool which comes from above the lower rectum is so great in the diagnosis of carcinoma of the colon that it is important that there should be no misunderstanding about it in diverticulitis. There are two errors made in the x-ray diagnosis, the more important one is the diagnosis of diverticulitis, when not present and at times one or more diverticula may be present suggesting a diverticulitis in spite of the presence of a carcinoma. I may say that I have been unfortunate enough to see several cases from my own and other clinics in which a diagnosis of diverticulitis was made in the presence of a carcinoma. In these cases the presence of blood in the stool aided me to make a correct diagnosis. If we admit that diverticulitis is "frequently" the diagnosis when there is blood in the stool, as suggested by Rankin, the result will be serious. I have within a year operated upon three cases because of blood in the stool and, in spite of an x-ray diagnosis of diverticulitis, have found cancer in each case. If we assume that bleeding never occurs with diverticulitis, we may occasionally operate unnecessarily, as blood may be due to diverticulitis alone in from 3% to 8% of such cases. If we neglect to operate when there is blood in the stool, the error will undoubtedly be much greater. I have operated upon but one case in which blood in the stool was associated with diverticulitis without carcinoma. The bleeding in that case was due to multiple polypi in the area of diverticulitis. If we use my own statistics and operate upon all cases of diverticulitis with bleeding, we will be in error in eight cases in each hundred, while if we neglect to operate we will be in error twenty-four times in each hundred cases.

I have now operated upon a sufficient number of cases of supposed diverticulitis with bleeding which have been found at operation to be carcinoma, to make me insistent upon an exploratory operation at least, and resection if there is the slightest suspicion of malignant disease. We must, of course, make sure that the bleeding comes from above the lower rectum and anal canal. The source of the bleeding can frequently be determined by the proctoscope. It will be seen by these figures that the danger of neglecting to operate when the blood is present with the diagnosis of diverticulitis, is two and one-half times greater than the danger of operating even when we allow for a mortality rate of 15% for the operated cases.

The second point of importance is the incidence of carcinoma arising in areas of diverticulitis, for it depends upon the frequency of this occurrence as to whether or not all cases of diverticulitis should be resected.

The early reports seemed to indicate that carcinoma frequently developed on diverticulitis. W. J. Mayo[9] in 1917 reported that out of forty-three resections of the colon for diverticulitis, carcinoma had developed in thirteen, or thirty-one per cent. McGrath[10] reported in 1912 that cancer developed on diverticulitis in 25.9%. L. B. Wilson's theory of cancer at this time was that epithelium was segregated in the tip of the appendix or diverticulum, where it proliferated, and finally infiltrated the wall as carcinoma. The finding of this segregation of cells

in diverticulitis probably accounted for the high percentage of carcinomata associated with diverticulitis up to 1917. These views on the segregated cells have not been generally accepted by pathologists. That they are not entirely correct is shown by the change in the incidence of carcinoma with diverticulitis since 1917.

Spriggs and Marxer[11] report that out of the first 100 cases of diverticulitis there were no more cases of carcinoma than in the average of the hospital population. In spite of this he agreed that any chronic irritation produced a predisposition to cancer, and agreed with the literature which expressed the feeling that people with diverticulitis were probably more liable to develop cancer than others.

In 1927 Lockhart-Mummery[12] reported eight cases in which he had performed a colostomy after a sinus had formed from an area of diverticulitis. Three out of these eight cases developed carcinoma in the sinus and died, one in eight years, one in three years, and one in two years. This he considers good evidence that carcinoma frequently develops in diverticula. There were no resections, so the diagnosis must be made by inference. The first case probably developed carcinoma after the sinus formed. In the last two cases living three and two years, the carcinoma might well have been the cause of the fistula. The average duration of life after a diagnosis of carcinoma is made is two years, according to Treves. Mellon, Soble, Davidson, and Fowler[13] report three cases of carcinoma of the sigmoid associated with diverticulitis. In the report of the cases, one gave no evidence of carcinoma, one showed early carcinoma in the edge of an ulcer, and the third was a case of advanced malignant disease.

In spite of this slight evidence of the relation of diverticulitis to carcinoma, their conclusion is: "That the conditions prevailing in these curious formations seem to facilitate the development of cancer which fact makes their early removal a matter of first importance to the patient." This might be true if the occurrence of carcinoma on diverticulitis was from 25% to 31% as given up to 1917, for then a mortality for resection of the colon of from 12% to 22% would have no terror for the surgeon, but does carcinoma occur in such a high percentage of cases of diverticulitis?

Fifield reports 218 cases of diverticulosis which came to autopsy which showed no cases of carcinoma. There were 52 cases of diverticulitis among the 218.

W. J. Mayo[14] in 1929 said that the relation between diverticulitis and carcinoma was "conjectural". Rankin in 1930 states that among 227 cases of diverticulitis there were only four cases of carcinoma, that is 1.7%. Of 679 cases of cancer of the colon, only four cases were associated with diverticulitis.

If we compare these recent statements and figures with those of 1917 and before, we find a very remarkable and important change. If we accept the development of carcinoma in diverticulitis in from 25.9% to 31% it is incumbent upon the surgeon to resect an area of diverticulitis whenever found. If on the other hand we accept the recent figures of 1.7% and even granting that they may be as high as 5%, we must of necessity refrain from operation because the mortality for resection of the colon ranges from 12% to 22%.

In conclusion I wish to emphasize two points:

(1) The occurrence of bleeding with diverticulitis is so rare that it is far safer to at least explore all cases of supposed diverticulitis with bleeding than to treat them medically. If all such cases were operated upon, there would probably be an error of 8%, while if none were operated upon there would be an error of 24%. The result of the error of operating unnecessarily is not serious; the result of neglecting to operate is very serious and means a mortality of 24%.

(2) There is no longer any reason for considering resection in cases of diverticulitis because of fear of the development of carcinoma. The more recent statistics indicate that cancer is associated with diverticulitis in from 1.7% to 8%, while the mortality from resection remains at from 12% to 22%.

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CHAIRMAN WALKER: The title of the next paper is "Results in the Treatment of Cancer of the Colon," by Dr. David Cheever, of Boston.

THE RESULTS OF TREATMENT OF CARCINOMA OF THE COLON AT THE PETER BENT BRIGHAM HOSPITAL, BOSTON*

BY DAVID CHEEVER, M.D.†

IN complying with the request that I participate in this symposium on carcinoma of the colon by discussing the results of treatment, it has seemed to me that the most useful contribution I could make would be to analyze and present the experience of a small urban hospital during the seventeen years of its existence,—as candidly and dispassionately as can be done by a member of its staff! It is hardly necessary to say to this audience that the treatment referred to is by surgical operation only, since we are all agreed that, whatever the future may hold in store, nothing but surgery offers at present any promise of cure or effective relief of this condition.

Before proceeding we must agree on what lesions shall be included in this analysis. At the proximal end of the colon there is no difficulty because in the neighborhood of the ileocecal valve carcinoma must be admitted to have begun in the colon rather than the ileum, because of the excessive rarity of the disease in the small intestine. At the distal end, however, where the sigmoid or pelvic colon at a certain point becomes the rectum, a differential criterion must be established to avoid confusion, because the disease in the rectum presents different characteristics and conditions which require that it should be separately considered and therefore preclude its inclusion here. The finger introduced into the rectum along the concavity of the sacrum reaches easily the upper border of the third sacral segment, which is agreed on by most anatomists as the point where the rectum begins; therefore, a growth at this point or below may be considered to be of the rectum, or in other words any growth which can be reached by the examining finger is considered to be outside the scope of this inquiry.

Examining the records of the Peter Bent Brigham Hospital from January 1913 to June 1, 1930 we find that the diagnosis of carcinoma of the colon occurs 193 times. In 31 of these cases the diagnosis is followed by a question mark, is accompanied by one or more additional questioned diagnoses, and is totally unconfirmed by x-ray, biopsy, operation, or autopsy. Such instances are not available for scientific inquiry. We are left then with the records of 162 patients which merit consideration.

In any inquiry such as this, which ought to be critically compared with the experience of other clinics it is essential to get the clearest possible idea of the standard of operability adopted. If timid surgeons avoid the responsibility of operating on any but favorable cases, their mortality record is likely to be better than that of clinics whose staffs are willing to offer the only possibility of relief to even the most desperate cases, without thought of statistics. This is a difficult matter to arrive at, but one way is to find out the percentage of patients operated on and analyze the instances in which operation was not done. We find that of the 162 accepted patients, 145 were operated on and 17 were not, giving an operability rate of 89.5%. Table 1 analyzes the 17 patients:

TABLE 1

CARCINOMA OF THE COLON

Analysis of 17 cases not operated on

Moribund when admitted	3
Refused operation	7
Diagnosis missed and patient operated on elsewhere	1
Obviously inoperable; no indication for palliation	6

Thus, in theory, seven of these patients might have been operated on; in one the diagnosis was missed; one showed a markedly enlarged liver and died in eight weeks; one showed enlargement of the liver and involvement of the stomach by x-ray and died in four months; one had myocarditis, hypertension and nephritis and died of uremia in twelve months; two had obviously inoperable metastases and were sent home, and cannot be traced. It should be repeated that in these six latter cases there was no indication for palliation.

A general view of what happened to the 145 patients operated on is given in Table 2 which shows the number and results of radical resections, palliative operations and explorations respectively:

TABLE 2

CARCINOMA OF THE COLON

Patients with positive diagnoses—162

Radical resections			78 or 48.1%
Operative recovery	63		
Died in Hospital	15		
Mortality		19.2%	
Palliative colostomy or short-circuiting			56 or 34.5%
Operative recovery	35		
Died in Hospital	21		
Mortality		37.5%	
Exploration only			11 or 6.7%
Operative recovery	7		
Died in Hospital	4		
Mortality		36.3%	
Patients not operated on			17 or 10.4%

Turning now to the 11 patients on whom a simple exploration was performed, with a mortality

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†Cheever—Associate Professor of Surgery, Harvard Medical School. For record and address of author see "This Week's Issue", page 489.

of 36.3%, we note that of the 4 who succumbed, two were found to have perforative peritonitis, one had a duodeno-colic fistula with peritonitis, and one had general carcinomatosis. Autopsies were obtained in all these cases. Evidently the inevitable end was hastened by hours or at most by days. The 7 patients who recovered have all been traced but one and had an average duration of life of 12½ months,—a rather long period, it would seem, for inoperable malignant disease. One patient lived 19 months after known liver involvement, illustrating how well worth while it may be at times to perform a radical resection for obstruction or bleeding even when hopeless metastases exist. In the case of a patient who lived four years after exploration had shown an adherent and apparently inoperable tumor of the sigmoid, the candid commentator cannot help feeling that the surgeon made an error in judgment. Biopsy proved that the diagnosis was correct, but it is highly probable that no metastases existed and that the fixation of the tumor was due to chronic inflammation which would have yielded to greater surgical audacity.

The analysis of the patients upon whom a palliative colostomy or short-circuiting operation was done causes perhaps at first thought considerable surprise and disappointment. There are 56 patients in this group of whom 21 died giving a mortality of 37.5%. Of simple colostomy only, there were 46 instances with 28 recoveries and 18 deaths,—a mortality of 39.1%, while of the presumably more serious operation of colocolostomy or ileocolostomy there were 10 instances with 7 recoveries and 3 deaths,—a mortality of 30%. To anyone familiar with the conditions in this type of patient the explanation of these high mortality rates is obvious. The patients were desperately ill; nineteen of them were completely obstructed; many had perforative abscess or peritonitis, nearly all in whom exploration could be done showed extension or metastases of carcinoma to other organs. The simple colostomies were usually done under local anaesthesia. The anastomosing operations were done undoubtedly on the less desperately ill patients and thus show a lower mortality. The following table (3) shows the causes of death in the 21 fatal cases (among whom 9 autopsies were obtained).

TABLE 3

CARCINOMA OF THE COLON

Causes of death in 21 fatal palliative operations

Peritonitis due to perforation of tumor	7
Pneumonia	4
"Shock"	3
Acute necrosis of liver	1
Pulmonary embolism	1
Obstruction due to adhesion	1
Natural course of disease and exhaustion	3
Peritonitis due to leak at anastomosis	1

But looking on the brighter side of the shield we find that the 33 patients traced among the 35 survivors of the operation lived an average of more than 7 months, in many cases in comparative comfort.

It is interesting to compare these figures with those reported by Turner[1] from Newcastle-on-Tyne, and to note their striking parallelism. He quotes a mortality rate of 20% for short-circuiting operations, and an average survival time of 7-8 months; a mortality of 37.5% after simple colostomy and an average survival time of 8 months, and a mortality of 42.8% after simple explorations. He has one patient still surviving for 4 years and 4 months after a colostomy for inoperable carcinoma.

The most important inquiry relates to the operations undertaken in the hope of curing the patient,—the radical resections, which, as noted above, were performed 78 times with 15 deaths, giving a mortality of 19.2% which compares in most striking fashion with Turner's mortality in a larger number of cases of precisely 19%.

Let us examine some of the conditions which contributed to success or failure in these patients. Almost all in whom the lesion was at a point beyond the hepatic flexure showed a greater or less degree of obstruction,—indeed the symptoms of partial obstruction were often the very first to call attention to the disease. In the proximal colon, on the other hand, where the fecal current is still liquid, obstruction was uncommon and the symptoms were chiefly due to ulceration, bleeding, inflammation, and infection, resulting in painful peristalsis, anemia and debility from toxemia. Evidently when obstruction becomes complete, a very serious element in the prognosis of operation must be introduced, so that it is somewhat disconcerting to learn from the analysis of this group of radical resections that of the 31 patients with complete obstruction when operated on, 26 recovered and 5 died giving a mortality of 16.1%, while of the 47 patients without complete obstruction 37 recovered and 10 died, giving a mortality of 21.2%. Thus obstruction appears as an actually favorable complication, and this is in accord with the experience of others. Certain of these neoplasms do not metastasize early and cause but little absorption of toxic products or bleeding, and thus create but little systemic disturbance; and when after a rather long, slowly increasing encroachment on the lumen they finally close down suddenly as the result of oedema or occlusion by a fecal mass, the patient may be in very fair condition and the obstruction, being low, does not cause immediately prostrating symptoms. Moreover, a preliminary colostomy, performed under novocain, is usually a simple affair and gives complete relief so that the patient may come to the more serious resection in very good condition. Perhaps the expression "complete obstruction" needs more definition. It is seldom so absolute as in obstruction by a band, twist, or strangulated hernia, and is lacking in some of the serious symptoms associated with

high obstruction when the persistent vomiting results in grave loss of chlorides, or where interference with the circulation in the bowel introduces new and dangerous elements. For the purposes of this review a complete obstruction was considered to exist where the patient had complete obstipation for two or more days together with any two of the three accompanying symptoms of the obstruction syndrome—pain, distention and vomiting. As a matter of fact all three were usually present.

This brings up the question as to the part played by preliminary drainage operation (colostomy) on the success of radical resection.

The figures are as follows:

Resections with preliminary colostomy		31
Recovered	28	
Died	3	
Mortality	9.6%	
Resections without preliminary colostomy		47
Recovered	35	
Died	12	
Mortality	25.5%	

This shows an advantage in favor of preliminary colostomy which cannot be argued away, although the figures, like most statistics, are slightly misleading and are capable of some misinterpretation. For instance, the whole group of lesions of the right colon are not susceptible to the performance of a preliminary colostomy. There were 17 patients with the lesion in the cecum, ascending colon or hepatic flexure in whom resection was done with 5 deaths, a mortality of 29.4%. Among these cases one preliminary ileostomy was done. Nevertheless, no principle is more firmly established than that resection of the large bowel in the presence of obstructive symptoms should be preceded by colostomy except in selected patients where simultaneous proximal drainage is provided at the time of the resection, and the surgeon should not be influenced, by a few brilliant contradictory results, towards adopting any other method.

A most interesting phase of the question of operability is furnished by examination of the instances of invasion of neighboring organs by carcinoma of the colon. Radical resection was performed in 8 patients of this type with 6 recoveries and 2 deaths, a mortality of 25%. The details are as follows:

Case 1. Sigmoid, uterus and adnexa.
Resection, panhysterectomy; still living at 4 months.

Case 2. Transverse colon and stomach.
Resection, recovery; lived 1 year.

Case 3. Transverse colon and duodenum.
Resection, recovery; living 2 years, 11 months.

Case 4. Sigmoid and bladder.
Resection, recovery; lived 4 years, 5 months.

Case 5. Sigmoid and bladder.
Resection, recovery; lived 4½ months.

Case 6. Transverse colon, jejunum and abdominal wall.
Resection, recovery; lived 1 year, 1 month.

Case 7. Transverse colon, sigmoid, ileum and stomach.
Resection, death.

Case 8. Hepatic flexure, gall bladder and duodenum.
Resection, death.

These are very formidable conditions, but there is much to be gained and usually but little to lose in trying to help them, and a recovery rate of 75% and an average survival time of more than 20 months in successful cases furnishes abundant justification for operation.

An analysis of the causes of death in the 15 fatal instances of radical resection is as follows:

Analysis of 15 Fatal Resections
(10 autopsies)

Peritonitis	6
Pneumonia	1
Operative shock	3
Cardiac	3
Intestinal obstruction	2

5 cases had metastases to liver, lungs or peritoneum.
1 case of peritonitis showed gross leakage at anastomosis.
2 cases of peritonitis originated at cecostomy or colostomy stoma.
3 cases apparently were due to infection existing at the time of operation.

These need no especial comment except perhaps to point out that leakage at the point of intestinal anastomosis or at the colostomy with resulting peritonitis is not much to be feared, since it occurred in only 4 patients among the 134 subjected to radical resection or palliative anastomosis and colostomy.

Another important subject of inquiry is the influence of inoperable metastases on the mortality of radical resection and on the survival period in successful cases. In other words, is it worth while to proceed with an attempt at resection of the carcinoma in the presence of inoperable metastases? Before answering this by an analysis of cases we must define our terms. Metastases (as distinguished from involvement of other organs by direct extension) occur in the abdomen by three methods,—(1) by the portal blood stream to the liver; (2) by the lymphatics to the lymph nodes; (3) by implantation, or possibly by lymphatics, to the peritoneum. Metastases to liver and peritoneum are easily diagnosed if sufficiently advanced to be visible, but the question of involvement of the glands may not be so easily settled. It is a common experience to find markedly enlarged mesenteric glands which on histological examination show nothing but an inflammatory reaction. Every malignant adenoma has an ulcerated surface which absorbs bacterial and other toxins—and indeed the bacteria themselves,—especially if situated in the proximal colon, so that an ex-

tensive and striking enlargement of the tributary glands and even those along the aorta may exist which seems to forbid an attempt at radical resection, whereas if the truth were known, the lymphadenitis is perfectly benign. In discussing the effect of inoperable metastases, then, the instances of alleged radical inoperability on account of metastatic glands so common in our hospital records are ignored, and only patients with actual involvement of the liver or peritoneum are accepted for inquiry.

In the radical resection group under consideration there were 14 patients with metastases in liver and peritoneum, of whom 11 recovered and 3 died,—a mortality of 21.4%, only a little higher than that of the group as a whole. Most satisfactory, too, is the fact that the patients who recovered lived an average of 17½ months. We are justified in concluding that the surgeon must not be deterred from performing a radical resection by the presence of extensive glandular enlargement or by metastases in liver or peritoneum, for the results are often surprisingly good. As Turner says: "A resection is often the best palliation".

While this communication deals with the results of treatment, it seems pertinent to introduce an interesting fact related to diagnosis brought out by the inquiry,—namely, the importance and reliability of the diagnostic barium enema. This was made in 99 cases;—it was positive in 89 cases or 89.8%; inconclusive in 9 cases or 9.0% and negative in only 1 case or 1%. In all these instances the diagnosis was proved by operation or autopsy. It is not intended to claim that in the 89.8% of positive cases a downright diagnosis of carcinoma was made by the roentgenologist; the report was of a filling defect, a narrowing, a persistent failure of the barium to pass a given point which led to the presumptive diagnosis of carcinoma as a likely cause and which inevitably led to the serious consideration of exploratory operation. In these patients, even when desperately ill, the enema in skilled hands is harmless; barium by mouth, on the other hand is inconclusive, dangerous and usually absolutely contraindicated.

We may now examine the actual results of successful resection:

DETAILS OF 63 PATIENTS WHO SURVIVED OPERATION

13 are alive, or are known to have died without recurrence more than 5 years after operation. Of these, 9 are alive, 4 have died.
16 are known to be alive less than 5 years after operation.
2 died without recurrence less than 5 years after operation.
25 are known to have died of recurrence.
7 have been lost sight of
  4 after 2 years
  1 after 5 years
  2 not traced after the operation.

The survival periods of the 9 patients alive and well more than 5 years after operation are as follows:

2 are alive between 5 and 6 years.
3 are alive between 7 and 8 years.
1 is alive between 8 and 9 years.
1 is alive between 10 and 11 years.
2 are alive between 12 and 13 years.

The causes of death of the 4 patients who died more than 5 years after operation, but without recurrence, are as follows:

1 died after 6 years; primary carcinoma cervix.
1 died after 8 years; acute mania and suicide.
1 died after 10½ years; acute cardiac infarction.
1 died after 10½ years of senility.

The survival periods of 16 patients known to be alive now, less than 5 years after radical operation are as follows:

6 less than 2 years.
2 between 2 and 3 years.
4 between 3 and 4 years.
4 between 4 and 5 years.

The survival periods of the 25 patients who are known to have died with recurrence are as follows:

7 died in less than 1 year.
8 died between 1 and 2 years.
6 died between 2 and 3 years.
1 died between 3 and 4 years.
1 died between 4 and 5 years.
1 died between 8 and 9 years.
1 died between 10 and 11 years.

In the interests of accuracy it must be stated that the present condition of the patients at present living after radical resection cannot be certified by personal examination in every instance. In some instances reports from the patients describing themselves as having entire freedom from symptoms have been accepted at their face value. No patient alive more than 5 years after resection is known to have recurrence; 2 patients alive less than 5 years are believed to have recurrence.

CONCLUSIONS

The following general conclusions are drawn from this survey of the patients with carcinoma of the colon who have been observed at the Peter Bent Brigham Hospital.

This localization of carcinoma is more favorable than any other in the abdominal cavity. While some cases are very malignant and fulminating, the majority are slow to metastasize and give indications of their presence early enough to afford promise of lasting relief, and probably of cure by operation. The mortality of radical operation is less than 20% in a series of patients in a hospital where the principle of treatment has been founded on a willingness to accept any reasonable chance for the patient. A closer selection of cases is probably not justifiable, though it would undoubtedly result in a lower mortality rate, but a better understand-

ing of the principles involved in the selection of methods, and the concentration of operations of this type in a few hands would probably reduce the mortality to 15% and perhaps lower under the best conditions of private practice. Metastases to the liver and peritoneum, constituting radical inoperability, and extension of the disease to other viscera should be by no means necessarily a contraindication to radical resection. Apparent involvement of lymph nodes which cannot be removed should not be a bar to resection, since their enlargement may be due to inflammation rather than carcinoma. Palliative operations in patients whose symptoms are incompatible with comfort and happiness are well worth while though they carry a high mortality. The barium enema in the hands of an expert roentgenologist is of the utmost value in diagnosis. The next few years will undoubtedly witness a lowering of the mortality rate of the operation for carcinoma of the colon, due to earlier diagnosis and a keener appreciation of the principles involved in the application of operative methods.

REFERENCE

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Discussion

Dr. Fred B. Lund, Boston: These papers have all been of such merit that it is very hard to pick out anything to criticize; one must try to criticize; however, one is also free to commend and I am glad to do so.

In Dr. Morrison's paper on the x-ray I was much interested in the statement that in about a hundred cases only thirty-five showed loss of weight. Statistics have recently been shown to prove that cancer is more common in fat people, and in waiting for a diagnosis of cancer until the patient is thin and emaciated, we are surely waiting until too late to do any good.

Duration of symptoms was about eight months. That has been confirmed both by the x-ray and the clinical papers. The finding of filling defect is the all-important thing. It is not always found, and I have done exploratory operations after repeated x-ray findings where a cancer capable of being resected was found, the filling defect not being found by the x-ray examinations for the reason that the lesion lay on either the front or back wall of the intestine so that the filling defect did not show.

Dr. Richardson's paper I will not discuss. It was too thorough and too good, but in reference to the operative treatment, I think there are some points we should take up. Resection of the intestine is difficult and dangerous in proportion to the infectious nature and the comparative fluidity of the contents; that is why resection of the small intestine is easy. The contents can easily pass on and there is no danger of obstruction.

In the large intestine, except at the cecum they (the contents) are often caught in haustra. It is hard with repeated enemas to empty the haustra of the colon.

Also a large part of the colon is retroperitoneal and has to be freed. That adds another complication. For this reason in operating upon the large intestine we see the great importance of two-stage procedures.

I was much interested in Dr. Cheever's delightful paper. It seems to me one reason he got better results in the obstructive cases was that in those cases the surgeon was sure to drain the intestine first, perhaps more certain to do it than they would in the cases which were not obstructed. In cancer of the left side of the colon a preliminary cecostomy should be done always or some method of drainage established and the colon repeatedly washed out.

Another very important thing which is going to help us more and more in the future is the long preparation of these cases, the emptying of the bowels five or six days before operation, enema every day, and allowing nothing but liquid diet with food which does not make any solid feces.

Another important matter is the long after treatment without food. Imagine the amount of trauma and swelling when you make an anastomosis say between the small intestine and the transverse colon, or any other part of the colon. There has to be. In the first place, there will be a temporary obstruction; therefore, the patient should not be fed for five or six days. You should depend on subcutaneous salt solution and give a little lemon juice by mouth and morphine, anything to keep him quiet; and wait until the swelling has subsided, at least four days before you begin to feed him. That has been brought out very well by the Mayo Clinic and I know it has saved lives in my hands.

The cecum, as Dr. Richardson said, is a dangerous place for cancer because it can grow to quite an extent without causing obstruction, and, as he stated, you have to make an early diagnosis. You can get a big growth in the cecum before the diagnosis is made, but above the cecum the obstruction comes as quickly as anywhere else. I find more cancers in the ascending colon than in the cecum. In that case you will take out the ascending colon and anastomosize the small intestine to the transverse colon. This procedure is so safe that you rarely need to do any preliminary drainage operation. You can catch up the end so that you can open it if you get a gas distention, but I have not been in the habit of even doing that.

In regard to cases where there is obstruction in the sigmoid or in the transverse colon, I have found Mikulicz's operation of greatest value. Take an old and feeble patient and you do not need any general anesthesia. You can bring the growth out, if it is the sigmoid, and you can cut it off with local anesthesia, and sometimes put on your clamps and sometimes close the fistula,

if you have to, at any rate with spinal, and without shock, or a serious or complicated anastomosis, you have your feeble patient well. That is a wonderful result and it is applicable in feeble patients with disease in the transverse colon as well as in the sigmoid flexure.

To Dr. Jones' paper on diverticulitis there is little to be added. My experience has been, it seems to me fairly large, and there have been two classes of cases, a perforation of the diverticulum with a local abscess, like a left-sided appendicitis, which you drain and usually they get well, but not always; and then you get an obstruction and thickening of the wall which looks like a carcinoma. In that case I don't know anything to do except a resection as if it were a carcinoma. It may be; you can't tell until you go in and find out. Diverticulitis seems to be very common in doctors—I don't know just why.

Dr. Cheever spoke of a cause of death after colostomy for cancer, namely, perforation of the growth; that has happened to me several times. It is very disconcerting, but if you do a colostomy, it certainly will not prevent a perforation, if the bowel is already almost ulcerated through at the time the operation is done.

In regard to multiple resections, I suppose I remember those who got well rather than those who died. I think we should not be discouraged about them. I have removed a sigmoid with a loop of small intestine adhered to it, twice resected the stomach with a transverse colon (one died and one recovered), and a case which I have now on my hands is that of a woman who had her bladder resected for a carcinoma and then established a fecal fistula which communicated with the bladder, and which was followed by a pelvic abscess, and when she came to me I drained the abscess. It took a long time before I could resect the carcinoma of the sigmoid and sew up my preliminary cecostomy. She recovered and was well for over a year, but now she has a recurrence.

I think in regard to the so-called aseptic methods of resection our success will be more marked in the future by very careful preparation before operation, the long continued starvation after operation and always doing a preliminary cecostomy; I almost said "whether we need it or not", than by so-called attempts at aseptic methods which I am always a little afraid of, lest I may make an obstruction. I have seen it successfully done, but I never can bring myself to do a resection by a method which is a little more complicated, it seems to me, than the ordinary procedure.

After cecostomy I have been very well satisfied with end to end suture instead of side to side anastomosis. In anastomosis of the ileum to the transverse colon the end to side is better. It does not leave a small end which may distend and actually start an inflammatory process.

My experience with diverticulitis in regard to the part of the intestine where it is found is like that of Dr. Jones. I have seen one case of diverticulum of the cecum in which I removed an apparent appendix and I found what proved to be a diverticulum on the wall of the cecum with a large concretion in it.

Dr. F. B. Sweet, Springfield: *Mr. Chairman and Fellows*—It seems almost presumptuous for one of comparative inexperience to discuss a subject which has been presented by the gentlemen who have read the papers to which we have been privileged to listen this morning. However, Dr. Rice and I have had a sufficient number of these cases to gain certain definite impressions. At the risk of repetition I wish to speak briefly of a few of them.

Firstly, we agree with Dr. Lund of the necessity of careful preoperative preparation whenever possible. Unfortunately a considerable percentage enter the hospital with acute obstruction and cannot be properly prepared.

Secondly, With increased experience we have become impressed with the desirability of the multiple stage operation, particularly if the procedure is so handled as to permit wide removal of the offending growth. We are doing fewer of these operations by the Mikulicz technique because we have come to feel that that technique does not permit of sufficiently wide resection of the gut and its adjacent mesentery. Furthermore, the said technique in our hands has been followed in one or two instances by transplant growths of the abdominal wall. For the above reasons we are more closely following the teaching of Dr. Jones in doing wide resection regardless of whether continuity of the intestine can be restored, feeling that an artificial anus with a wide resection is better surgery than inadequate resection and a restored intestinal tube. The artificial anus is not so troublesome, if properly made and placed, as has been considered. This is particularly true if the patient is taught to take care of himself and not to depend upon an attendant or nurse.

In low lying growths of the sigmoid and rectosigmoid it is highly desirable to so perform the first stage of the operation as to permit the thorough cleansing of the lower segment. This permits a comparatively clean second stage operation.

I do not feel competent to discuss Dr. Jones' paper. I do feel, however, that everyone of us here present has been privileged to listen to a masterly exposition of the subject of diverticulosis and diverticulitis.

Chairman Walker: The discussion will be continued by Dr. P. E. Truesdale, of Fall River.

Dr. Truesdale was not present.

Chairman Walker: Dr. H. B. Loder, of Boston, will continue the discussion.

Dr. H. B. Loder, Boston: A subject so thoroughly covered as this does not leave much room

for discussion except when it comes to the matter of treatment. Answers to all our questions as to treatment have not been given, except as Dr. Richardson said, on the right side of the abdomen the technic is pretty well established. When it comes to the left side, we have to strike the balance between the simple single-stage operative procedure, when it is possible, and the multiple-stage operations when they are necessary for safety.

Any patient prefers to go through a single operative procedure rather than two or three or four-stage operations, if it can be done with equal safety. How are we going to find the way to choose the patients who can be operated on with primary resection with equal safety in comparison with the multiple operative cases? That is not so easy.

In the first place, the preparation of the patient, so far as dehydration and cleanliness of the bowel are concerned, has to come first and has to be absolutely satisfactory before there is any question of a primary resection.

I should like to disagree with Dr. Lund a little in the importance of the aseptic methods of resection. I do think that we should use a technic for primary resections which approaches true asepsis. Several procedures make this possible, provided you have mobilized the bowel sufficiently.

Schoemaker, of Holland, has done some rather remarkable work in showing what can be done in primary anastomoses. I think his work has not had any particular attention paid to it here and I don't suppose it is known that he showed that a suture line involving the mucous membrane of the bowel in anastomosis is not necessary to control the hemorrhage, that is, the mucous membrane layer alone.

The guillotine method, permitting the anastomosis to be made with a closed bowel gives a nearly perfect aseptic technic. Here the controlling ligatures are cut after the anastomosis is made. Either one of those methods will give an aseptic technic that comes relatively close to the asepsis of the handling of the appendix stump, and does make it possible to save some patients the multiple operative procedure.

I think the pendulum is swinging rather far. Certainly it is swinging towards the side of multi-stage operations for all of the left-side cases. I still feel that there are cases to be selected who deserve a single stage operative procedure, to their great advantage; but I must admit that the burden of the proof is somewhat on the surgeon who does that at the present time.

Dr. John Fallon, Worcester: Just a word about Dr. Cheever's paper. There are other series of these cases, some containing a much larger number, but those of us who know the Brigham Hospital and Dr. Cheever know that none of them rest on a surer basis of careful clinical observation. And I think that is more important than the number of cases.

As to Dr. Jones' paper: whether diverticulitis of the colon causes carcinoma is not at all an academic question. To the person who has diverticulitis it is about the most important question his doctor can answer. Many of us, including some who have written about it, know either no answer or the wrong answer. This has been a definite niche in our knowledge, and Dr. Jones has filled it. I want to offer you some little additional evidence corroborating his answer.

I recently reviewed the case records of 1800 patients who had diverticulosis of the colon, at the Mayo Clinic. Of these 1800, 625 had diverticulitis. Of the 625 who had diverticulitis, only half of one per cent. also had carcinoma of the colon. If there is any inaccuracy in these figures, and of course it is possible, it is on the high side, because, necessarily, you see, this is a group having colonic symptoms and it is necessarily a group in the cancer age. At any rate, I think the figure 0.5 per cent. is rather low for clinical significance.

Reversing our field, the alternative of the question may be investigated. Are more diverticula found in people who have carcinoma of the colon than in the normal group? Of sixteen hundred operated proven cases of colon carcinoma at the Mayo Clinic, nineteen showed, in addition to the cancer, diverticula. Most of these nineteen had asymptomatic, uninflamed diverticula—that is, diverticulosis—and of the few with diverticulitis, several had the two lesions separated by a foot or more of bowel. In only one was there reasonable evidence that the carcinoma had arisen in a diverticulum.

Now, there is no more reason to expect the epithelium of a diverticulum to be immune from cancer than to expect it of epithelium anywhere. I think this mass of approximately 1600 carcinomata and 1800 diverticulosis cases in which the coincidence was only 19 times suggests that whatever the possibility, the occurrence is not important.

What is important, as Dr. Jones said, is the occasional difficulty in distinguishing between the two conditions. Given an encircling mass obstructing the sigmoid, and diverticula shown by x-ray, do the diverticula cause the mass, or is it carcinoma? Who is to say? Not the clinician, although bleeding is always suspicious; the surgeon at operation rarely; still more rarely the proctoscopist. The roentgenologist usually, but sometimes not. Sometimes only the pathologist, after the lesion has been resected.

This debatable group—the patient with obstructing mass and undecisive x-ray, and the patient who bleeds—seems to be in the surgeon's province. Half or more of them in the cases I reviewed were false alarms, but it seems that in treating them, the surgeon should be as

radical as in treating other forms of diverticulitis, he is conservative.

Dr. L. R. Whitaker, Boston: I should like to report a new method, at least, I think it is new, of aseptic anastomosis for the colon. So far it has been tried only on animals at the Boston University School of Medicine. It is done by the aid of electro-surgery.

The ordinary principles of anastomosis need to be followed. These would include preliminary colostomy and mobilization of the colon. The method consists first in placing two circular ties around the bowel at a distance of about one to two centimeters at either end of the loop to be resected. Then, with the electrosurgical unit, set for cutting current with high dehydration, producing a cautery effect, the bowel is severed between the two ties at either end of the loop. If it is not completely sterilized as it is cut off, a little extra coagulation is applied so that the field is thoroughly aseptic. Then either end of the bowel to be anastomosed is coagulated, or perhaps we had better say "devitalized", by the fulgurating current—the whole end, back to the full lumen of the gut. After that the ends are simply approximated by a double row of sutures around the devitalized areas.

This method has not only the advantage of being aseptic, but it is practically without trauma. The tissue at the end of the bowel can be killed with a fulgurating current up to a very definite line. Two millimeters from that line it can be thoroughly normal, showing good circulation. No forceps or clamps are used, the closed ends of the gut being manipulated with the fingers. The tissue is kept moist. After the anastomosis is completed, you can see the pulsation of very small vessels two millimeters from the line of anastomosis. Within twelve hours the devitalized ends of the bowel which are enfolded slough out, reëstablishing the lumen.

Then, if care has been exercised in placing the sutures, there will be a very definite line of approximation of the mucosal edges of the bowel, which will readily heal.

Of course, this method necessitates a preliminary colostomy. Our results in experimental animals have been excellent. There have been very few adhesions to the line of anastomosis, showing little trauma to the surrounding peritoneum; and leakage has been very rare.

Dr. Jones: A word about the papers in general. I hope that you will all get the feeling of confidence with which Drs. Cheever and Richardson spoke of the value of operation in this condition. Too many feel hopeless about this disease in the large intestine. I also hope that you will remember what Dr. Morrison has said about x-ray diagnosis. The roentgenologist is not a mind reader; you should give him some idea as to what he is to look for. Four-leaf clovers are not often found unless one is looking for them. A routine examination by any roentgenologist should not be made until after the rectum has been examined digitally and with the proctoscope. Recently a patient was advised by a roentgenologist to have a proctoscopic examination as he was suspicious of malignant disease and could find none by x-ray. A rectal specialist instead examined him digitally twice at an interval of several months, but found nothing. Nine months after the first examination he was operated upon for an advanced carcinoma of the rectum.

You are told that diagnosis of cancer of the colon and rectum is difficult, but this is exaggerated I am sure. The great trouble is that few take an interest in the disease. The proof of this is found in statistics. There are about 1200 deaths from cancer of the intestines per year in Massachusetts. I have tried to estimate liberally the number of radical operations per year and cannot possibly account for more than 150. This small number is still further confirmed by Dr. Cheever's statement that there have been but 78 radical operations for cancer of the colon at the Peter Bent Brigham Hospital in 17 years.

In carcinoma of the rectum we are also told that the diagnosis is difficult and yet if patients go to a doctor with even a suggestive symptom, a correct diagnosis should be made in 100% of the cases. Digital examination will make a correct diagnosis in 75% and a proctoscopic examination will make it in the other 25%.

Dr. Morrison: I wish that you men could realize that when an enema is given, the colon behaves just like an individual. One finds all types; the fat, the skinny, the goodnatured and others. Its reactions are often just as temperamental as those of an artist, and this frequently leads to a diagnosis.

Dr. Jones gave statistics in relation to the increasing occurrence of malignancy on areas of diverticulitis. It was only a short time ago that George and Leonard wrote that malignant invasion of diverticulitis was rare. Today many more cases are being found. I believe that the first case of diverticulitis itself, described by a roentgenologist, was done by Dr. LeWald of New York City in 1915. Many of these patients refuse at first to be operated upon. The roentgenologist can be an aid to the surgeon in these cases. As bleeding is the significant symptom of malignancy, the roentgenologist, by careful study made at intervals of three weeks on the patient who is on strict medical treatment, can tell whether the inflammation has subsided and the area of diverticulitis has become perfectly flexible. If it does not do this, malignancy must be considered and this added weight of evidence will often alter the patient's decision, allowing the necessary operation.

I want to add just a word to what Dr. Cheever said in relation to the accuracy of the roentgenologist. One must expect from such high

grade roentgenologists as are found at the Peter Bent Brigham Hospital, a higher percentage of accurate diagnoses than the average. My figures relate to what is to be expected of the average roentgenologist scattered over the country. The failures are too high, approximately 10%, and can be lowered.

Relative to Dr. Lund's remarks: I wish to say that of 84 out of 102 cases of malignancy found at the New England Deaconess Hospital in which the records were complete only 34 cases show loss of weight. This is a percentage of but 41.6%.

CHAIRMAN WALKER: Dr. Richardson, do you care to add anything to close the discussion?

DR. RICHARDSON: Nothing more, thank you.

DR. CHEEVER: It seems to me unfortunate that this symposium could not have been given in a great auditorium, filled not only with surgeons, but with internists and general practitioners;—it is too bad that we cannot reach more people. There are still many general practitioners and even a certain number of internal consultants who really believe that there is not much use in operating on internal carcinoma. Isn't that so?

There is just one other point I wish to make:—a great deal of emphasis has been laid on drainage and cleansing of the colon preliminary to these operations. In my opinion a tube cecostomy which is so generally used does not do this nearly so effectively as a transverse colostomy of the permanent type which diverts the entire fecal current and permits washing out and cleansing thoroughly the distal bowel including the site of the lesion. It may later be closed quite easily under novocain anaesthesia. I want to urge you to consider, therefore, the advisability of a preliminary proximal transverse colostomy, of permanent type rather than with a tube, instead of the usual cecostomy.

Just a word about the Mikulicz procedure. I happen not to like it,—very likely because I do not do it very well,—and to my considerable pleasure I found in working out these statistics that so far as the Peter Bent Brigham Hospital is concerned the advantages seem to lie with other methods. It doubtless has a definite field of usefulness, but I believe it is an overestimated operation.

CHAIRMAN WALKER: I think we are all very grateful to the readers of these papers and to those who have discussed the subject.

Before we close, Dr. Fletcher H. Colby, of Boston, will speak on a new preparation in which urologists are interested, called Uroselectan.

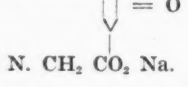
DR. FLETCHER H. COLBY, Boston: *Mr. Chairman and Members of the Society:* I am sorry to speak on a subject that is so little related to what has taken place previously, but this is a new method for diagnosis which has been developed within the last year and which has come into prominence only within the last few months. You undoubtedly will hear a good deal about it within the next few months, and will be flooded with more of the inevitable medical literature on the subject.

INTRAVENOUS UROGRAPHY*

BY FLETCHER H. COLBY, M.D.†

VISUALIZATION of the urinary tract by means of intravenous injection has become an established procedure. A considerable amount of work has been done in this direction during the past ten years but until recently no satisfactory preparation had been developed. Previous drugs for intravenous injection had either given shadows that were too faint by the x-ray to be of practical value, or had been toxic beyond the point of tolerance.

Professor Arthur Binz of Berlin, Germany succeeded in synthesizing a compound which appeared to meet all the requirements for visualization of the urinary tract by intravenous injection. This substance was called uroselectan and is a pyridin derivative with the formula:



Uroselectan contains 42% of iodine, the iodine being so placed on the pyridin molecule that a substance of low toxicity results. It is unique in this respect among the iodine compounds, the reason being that the iodine is in such close combination with the molecule that it is not easily split off. The result is that uroselectan goes through the body unchanged. Uroselectan was chosen among other similar compounds developed by Professor Binz because of its high percentage of iodine, low toxicity and high solubility. Practically all of the drug is eliminated by the kidneys.

The experimental work with uroselectan for intravenous injection was under the direction of Professor Alexander von Lichtenberg of Berlin, Germany. It was used in seven hundred cases in Professor von Lichtenberg's clinic with excellent results. Although the work is still in an experimental stage certain details are already definite. The intensity of the x-ray shadows depends on the integrity of the kidneys and their ability to excrete the compound. Hughes, working in von Lichtenberg's clinic demonstrated by glomerular puncture in frogs that the drug is excreted principally through the

*From the Urological Clinic of the Massachusetts General Hospital.

Read before the Section of Surgery of the Massachusetts Medical Society at its Annual Meeting at Plymouth, June 18, 1930.

†Colby—Assistant Urologist, Massachusetts General Hospital. For record and address of author see "This Week's Issue", page 489.

glomeruli. If extensive renal damage is present, particularly cortical, faint shadows or a total absence of shadows may be expected. The drug, therefore, presents a visual estimation of kidney function. Possibly of particular importance is the fact that by this method we may estimate the function of separate parts of each individual kidney and as von Lichtenberg says, "while this visualization is not a precise method, it is satisfactory for clinical interpretation and judgment of surgical lesions." Its value in this respect will have to be determined by further experience.

Since about 90% of the total amount of uroselectan injected intravenously is eliminated by the kidneys, the amount recovered in the urine in a given length of time will serve as a functional test of the kidneys in the same manner as the phenolsulphonephthalein test. The amount of iodine recovered in the urine can be determined and it has already been shown that when kidney function is good fifteen to sixteen grams of iodine are eliminated in the first two hours after injection. An estimation of the retained iodine in the blood also serves as a retention test of kidney function. Most of the drug is eliminated by the kidneys within the first two hours.

The finding of a low toxicity of the drug for intravenous use seems to have been the experience of all who have used it. A moderate flushing of the skin usually occurs within a few minutes of injection and lasts for several minutes. None of the patients in our experience have suffered more discomfort than a feeling of general warmth and I have seen no serious reaction of any sort follow its administration. It seems surprising that so large an amount of iodine injected into the circulation should cause so little disturbance.

Through Professor von Lichtenberg, uroselectan was supplied to about fifteen of the urological clinics in the United States. This was to be used during the first few months of this year and the results reported at the meeting of the American Urological Association in New York, June twelfth. Other means of securing uroselectan were not possible until the results of these workers were discussed. Professor von Lichtenberg is to be commended on the excellence and thoroughness of his work and the care he has taken in introducing this new preparation.

It was generally agreed after the urological meeting that uroselectan was a valuable addition to our diagnostic methods. However, intravenous urography should not be regarded as a method of displacing the usual means of visualization of the urinary tract but rather of supplementing other tried methods of proven value. In certain instances uroselectan gives information obtainable in no other way. In some cases a satisfactory diagnosis may be made without

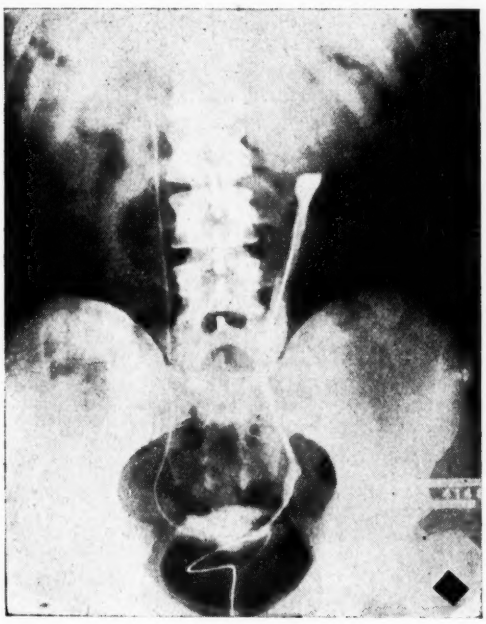


PLATE I. Case I. Right ureterogram obtained by the usual method with sodium iodide solution. Note complete obstruction at the uretero-pelvic junction.

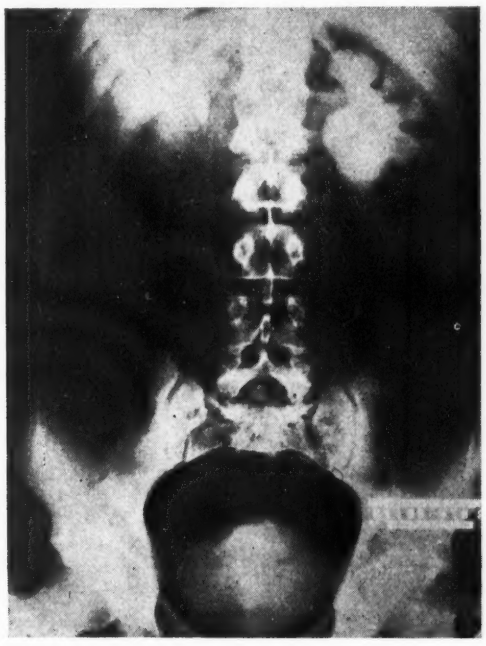


PLATE II. Case I. Right pyelogram of the same case as shown in the previous plate obtained by the intravenous injection of uroselectan. The shadow of a normal left kidney pelvis was obtained in an earlier x-ray plate. This picture was obtained two hours and fifteen minutes after injection and shows a moderate hydronephrosis.

The administration and dosage of uroselectan are simple. Forty grams of the drug are dissolved in one hundred c.c. of redistilled water. The solution is filtered and sterilized. The entire amount is slowly injected into a vein of the forearm. Children and infants are given a correspondingly smaller dose.

a cystoscopic examination. Interpretation of the results obtained by its use requires all the skill and judgment of previous pyelographic diagnostic measures to which may be added the uncertainty and inexperience of a new method. As a means of studying the physiology of the ureter it has been disappointing. As a method of radiographic study of the urinary tract its results have been excellent in many instances,

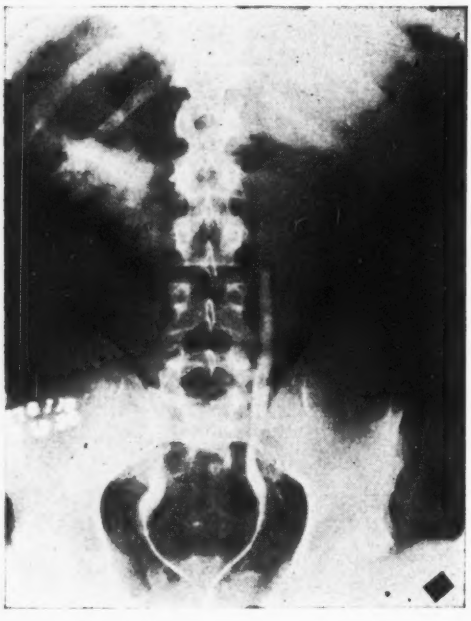


PLATE III. Case II. Bilateral pyelogram obtained by the usual method with sodium iodide solution. Note complete obstruction at the uretero-pelvic junction. Left pelvis shows a little dilatation.

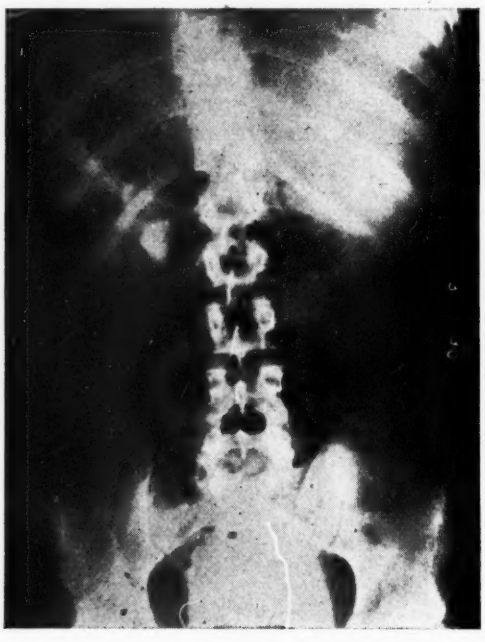


PLATE IV. Case II. Left pyelogram of the same case as shown in Plate III, one hour after the intravenous injection of uroselectan. No shadow of the right kidney pelvis was obtained four hours after the injection. At operation the right kidney was found to be completely obstructed and this organ was undoubtedly not functioning.

but variable and disappointing in some. Poor visualization, it is true, is to be expected where there is appreciable renal damage, but we have seen several cases with kidney function proved normal by the usual tests in which the results with uroselectan were poor. The best pictures are obtained where there is a partial degree of obstruction to the free drainage of urine, as in calculous disease. The method should not be used indiscriminately.

According to von Lichtenberg from a clinical viewpoint, intravenous urography is indicated in the following conditions:

"I. Those cases in which, due to anatomical and pathological or technical reasons, it is impossible to use cystoscopy, ureteral catheterization or instrumental pyelography.

II. In those cases of ureteral obstruction in which the pyelographic solution cannot be injected beyond the obstruction.

III. In those cases in which instrumental pyelography carries a risk for the patient.

This group of relative indications can necessarily be enlarged to include those cases in which we do not wish to subject the patient to instrumental procedures and in which we can obtain sufficient information by means of intravenous pyelography."

REFERENCES

Von Lichtenberg, Alexander: The Principles of Intravenous Urography. Read before the American Urological Association, New York City, June 12, 1930.

The following officers were elected to serve for the ensuing year in the Section of Surgery:

Chairman—Dr. George Albert Moore, Brockton.

Secretary—Dr. Francis C. Newton, Boston.

The Section on Surgery adjourned at twelve-ten o'clock.

PRIMARY CARCINOMA OF THE LUNG. A STUDY OF 18 AUTOPSIED CASES*

BY M. FREMONT-SMITH, M.D.,† J. LERMAN, M.D.,† AND P. D. ROSAHN, M.D.†

PULMONARY malignancy was first systematically discussed by Adler[1] in 1912. His monograph was thorough and exact, and his conclusions hold good today. Since Adler's work, valuable papers have been published by Fried[2], Fishberg[3], Grove and Kramer[4], McCrae, Funk and Jackson[5], Simpson[6], and Weller[7]. The present report is based upon eighteen cases, admitted to the medical wards of the Boston City Hospital between January 1915 and July 1929 and proven to be primary carcinoma of the lungs by autopsy examination. In ten of the eighteen cases a correct diagnosis was made antemortem.

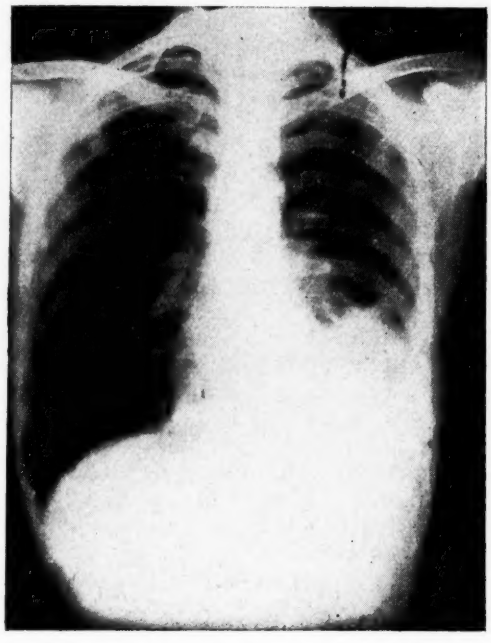


FIG. 1. Oct. 23, 1928. Circumscribed area of density filling lower third of left chest; encapsulated fluid or tumor mass.

Primary carcinoma of the lungs should not be considered a rare disease[9]. It is found about once in every 200 autopsies upon adults, and about once in every twenty deaths from carcinoma[8]. Kikuth[10] reports that in Hamburg it is one-third as common as carcinoma of the stomach. One or two cases of primary carcinoma of the lungs may be found in the wards of our larger hospitals almost the year through.

Weller states that 74 per cent. of all cases of pulmonary cancer occurs in males. In the present series there were seventeen males and one female. The youngest patient was 29 years of age; the majority were in the fourth, fifth, and sixth decades of life—the usual cancer age. Two patients were over seventy years old.

*From the Fourth and Third Medical Services of the Boston City Hospital.

†Fremont-Smith—Instructor, Harvard Medical School. Lerman—Research Fellow in Medicine, Harvard Medical School. For records and addresses of authors see "This Week's Issue", page 489.

MODE OF ONSET

Students of the subject stress the insidious onset of cancer of the lung. From the patient's point of view, the onset of symptoms is fre-

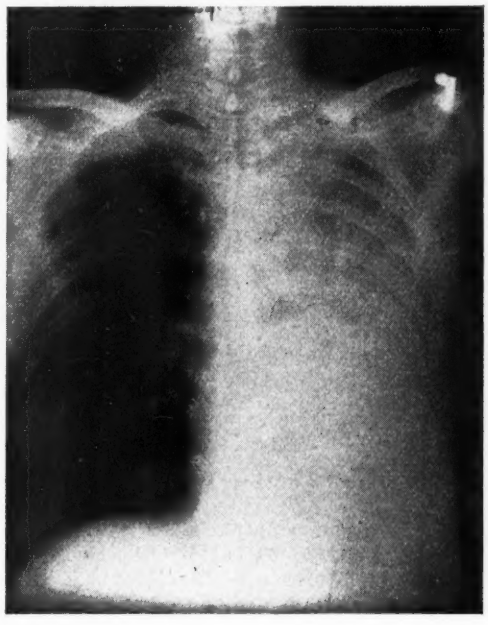


FIG. 2. Oct. 26, 1928. Cloudiness involving lower two-thirds of left chest; heart not displaced; no evidence of tuberculosis; picture consistent with new growth at base of left lung and some fluid in pleural cavity.

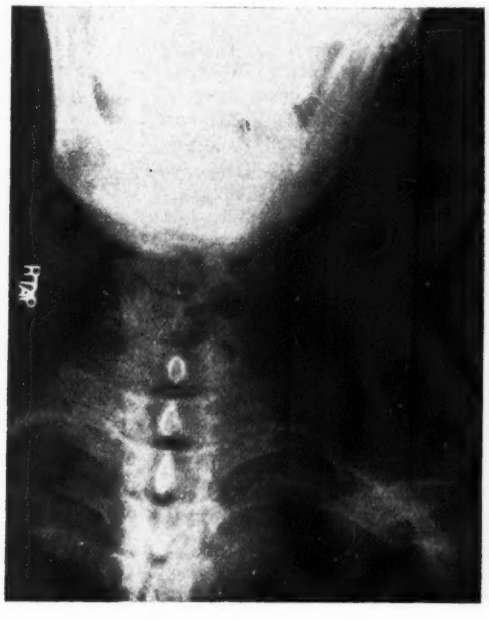


FIG. 3. Nov. 8, 1928. Cervical spine shows destruction in left side of bodies of sixth and seventh vertebrae; question of metastases.

quently by no means insidious. Cough and general malaise may be slight. The first important symptom may be due to invasion of the pleura, by extension, or of the bones by metastases[2].

For four months before admission, a man of 52 (Case 1) noticed unusual fatigability, shortness of breath and slight cough. These symptoms disturbed him very little. What brought him to the hospital was a sudden snap in his chest "like a stick breaking". A "spontaneous" fracture of a rib was demonstrated.

Another patient (Case 3) complained of pain in the shoulder, of two weeks' duration. Hypertrophic arthritis of the cervical spine was suspected and verified by x-ray examination. A month later the patient returned with a "chronic cough" and evident disease of the lungs. Reëxamination of the original roentgenograms showed that the diagnosis first made was wrong. The films with the later interpretations by Dr. P. F. Butler are reproduced above.

We consider it important to tabulate the symptoms in the order in which they appeared in each case (Table I), as well as to summarize important symptoms, laboratory findings and physical signs (Table II).

TABLE I

SYMPTOMS IN ORDER OF APPEARANCE

CASE 1.	Cough and chest pain for five months. Fatigue and dyspnoea for five months. Hemoptysis for one week.
2.	"Pneumonia" nine months ago; Since then slight cough and pains in joints (due to metastases?). Patient lost forty pounds of weight in ten months.
3.	Cough, hemoptysis, pain in chest and left shoulder. Duration?
4.	Chills, fever, sudden pain in chest, onset five months ago. Lumbar pain for one month. No cough, sputum or dyspnoea.
5.	Sudden onset of severe cough with blood-streaked sputum two weeks ago.
6.	Slight cough and malaise for three years. Hemoptysis for eight months.
7.	Patient was irrational.
8.	Pain in lower back and dyspnoea for two months. Swelling of left leg for one month.
9.	Dull lumbar pain for five months. Dyspnoea for three months.
10.	Cough, sputum and loss of ten pounds during two years. Blood-streaked sputum for six months. Chest pain for three months.
11.	Hoarseness and loss of ten pounds during six months.
12.	Dyspnoea and chest pain for three weeks. Cough for two days.
13.	Chest pain and cough for five days. Dyspnoea for five days.
14.	Cough for one year. Loss of ten pounds of body weight in preceding three months. Hemoptysis for two months.
15.	Headache, cough, hoarseness for one week.
16.	Weakness for two months. Dyspnoea, cough and pain in the shoulder for one month.
17.	Cough and chest pain for three weeks.
18.	Cough for two years. Dyspnoea and hoarseness for six months. Chest pain for four months.

The most constant symptoms in this series of 18 cases were dyspnea and cough, noted in 16 and 14 instances, respectively. Chest pain was present in 12 patients. Sputum was specifically mentioned in the records as present in twelve cases. In six the sputum was frankly bloody, in the remaining six, streaked with blood. "Currant jelly" sputum was not observed. Definite clubbing of the fingers was noted in five instances.

Five patients were afebrile while in the hospital wards. All the others had more or less fever. In one case with an unusually malignant tumor, a few days of fever alternated with short periods of normal temperature over several weeks. We agree with Adler and others that fever in cancer of the lung is probably caused by secondary infection, but it may be due to the necrosis of tumor tissue which is so often the reason for fever in patients with widespread cancer of the internal organs.

Anaemia was frequently present but usually slight, as indicated in Table II. The blood pressure was consistently low, considering the ages of the patients. Pleural effusion was demonstrated clinically in eight cases. The effusion was clear or turbid in five, and sanguineous in three.

By comparison, Weller[7], analyzing the symptoms in 100 cases of primary cancer of the lung, found cough in 61, sputum in 47, chest pain and dyspnea each in 44 cases. Simpson[6], reporting 139 cases, found, in order of frequency: cough, pain, wasting, dyspnea, sputum, fever, hemoptysis. Effusions occurred in 30 of his cases; in nine the effusion was bloody.

EXAMINATION OF THE CHEST

The physical signs relative to the chest are listed in Table III. In three cases massive pleural effusion was found, with displacement of the heart away from the lesion. In three other cases the signs suggested fluid, free or encapsulated, but the heart was displaced towards the affected side, suggesting collapse of the lung.

Pulmonary carcinoma takes origin from the bronchial epithelium. In the early stage cough and sometimes hemoptysis result from local irritation, and physical signs may be negative. Later, when the tumor fills and closes the bronchus, collapse of the portion of the lung supplied by the bronchus takes place. There then are present diminished or absent breath sounds diminished or absent tactile and vocal fremitus, dullness, and either no râles or a few râles characteristically variable even from hour

TABLE II.

Case Number	Age—Years	Chest Pain	Cough	Dyspnoea	Sputum	Hemoptysis	Loss of Weight in pounds	Clubbing of Fingers	Fever	R. B. C. in millions per cu. m.m.	Hgb. in per cent.	W. B. C. in thousands	Kahn or Wassermann	Blood Pressure
1.	52	+	+	++	+	+	5	0	+	4.3	80	9.0 13.5	Neg.	140/85
2.	48	+	+	+	+	+	35	+	+	3.2	60	5.3 10.8	Neg.	110/80
3.	44	+	+	+	+	+	25	—	+	3.8	40	12.0	—	135/90
4.	44	+	0	0	0	0	20	++	+	4.5	85	11.2 15.4	Neg.	105/90
5.	68	0	+	0	+	+	4	—	+	—	80	9.8	Pos.	110/80
6.	64	0	+	+	+	+	+	+	±	4.0	93	8.7	Pos.	140/90
7.	73	0	+	+	0	0	+	0	0	—	80	10.6	Neg.	100/58
8.	65	0	0	+	0	0	30	0	0	—	85	16.0	Neg.	—
9.	54	+	0	+	0	0	10	—	+	—	—	—	Neg.	120/90
10.	58	+	+	+	+	±	+	++	+	3.6	75	15.6 21.0	Neg.	125/65
11.	68	0	0	+	0	0	25	—	0	—	—	—	—	—
12.	55	+	+	+	+	+	10	—		—	75	13.0	Neg.	135/75
13.	72	+	+	+	+	0	0	—	+	—	—	7.4	—	—
14.	45	+	+	+	+	+	+	0	0	*2.5	75	9.0 13.0	Neg.	115/100
15.	64	0	+	+	+	0	++	—	±	—	80	13.5	Neg.	140/80
16.	29	+	+	+	+	+	0	—	0	3.0	60	7.0	Pos.	150/90
17.	55	+	+	+	0	0	±	—	+	—	—	—	—	—
18.	62	+	+	+	+	±	++	++	+	4.0	80	20.6 40.0	Pos.	—
		—	—	—	—	—		——	—					
Totals		12	14	16	12	8		5	10					

*Probably incorrect; not checked.

TABLE III

Case Number	Physical Signs in Chest	Roentgen-Ray Interpretation	Additional Findings in Hospital	Anatomical Findings (Thorax)
1.	Flatness at base of left lung; fremitus absent; no râles. Dullness and râles at apex of right lung.	Fluid in pleural cavity. Fibrosis of left lung.	Pleural effusion. Metastases in ribs.	Primary carcinoma of bronchus. Bronchopneumonia.
2.	Dullness at apex of left lung with diminished tactile fremitus and distant bronchial breathing. A few râles. Heart displaced to left.	Diffuse cloudiness of whole left chest, and apex of right lung.	Dyspnoea, hemoptysis and hoarseness. Metastases to the long bones.	Primary carcinoma of bronchus.
3.	Dullness at the apices of both lungs, with a few râles. Flatness at the base of the left lung, with diminished breathing and fremitus.	Circumscribed area of density in the lower third of left chest—fluid or tumor.	Pain and stiffness of cervical spine. "Hypertrophic arthritis."	Primary carcinoma of bronchus. Lung abscess.
4.	Dullness, diminished breathing and fremitus at base of left lung. No râles.	Mottling through entire left lung. Tuberculosis.	Liver nodular. Metastases to the skin.	Primary carcinoma of bronchus.
5.	"Negative."	——	——	Primary carcinoma of bronchus. Lobar pneumonia; old pleuritis.
6.	Flatness at the base of left lung. Breathing and fremitus absent. No râles.	Tuberculosis, with effusion or thickened pleura.	40 c.c. dark pus obtained by lung tap.	Epidermoid carcinoma. Organized pneumonia.

TABLE III (*Concluded*)

Case Number	Physical Signs in Chest	Roentgen-Ray Interpretation	Additional Findings in Hospital	Anatomical Findings (Thorax)
7.	Dullness and flatness of entire left chest, with bronchial breathing and increased fremitus anteriorly. Decreased fremitus posteriorly.	Increased density of the left lung. ? consolidation. Circumscribed area of increased density by fluoroscope — tumor.	Bloody, pleural effusion.	Primary carcinoma of left bronchus.
8.	"Negative."	———	Progressive weakness. Increasing edema of left leg.	Carcinoma of left lung. Thrombosis of iliac veins.
9.	Dullness to flatness throughout left chest. Bronchovesicular breathing over upper right lobe of lung.	Cloudiness of entire left chest. Infiltration of right lung field.	Pain in left chest and forehead. Metastases to frontal bone. Straw-colored pleural effusion.	Primary (?) carcinoma of lung.
10.	Right lung base dull to flat. Fremitus diminished. Dullness at right apex with increased whisper; râles present.	Mottled infiltration with increased density at the right base. Heart displaced to right.	———	Epidermoid carcinoma of lung. Healed tuberculosis right lung.
11.	"Negative."	———	Sudden death.	Primary carcinoma of lung. Metastases to mediastinum and heart.
12.	Entire right chest is dull to flat, with diminished fremitus and breath sounds. No râles. Friction rub at left base.	Increased density throughout right chest. Heart displaced to left.	Clear pleural effusion; bloody at later tap.	Primary carcinoma of bronchus. Acute pleuritis; hydropericardium.
13.	Dullness and bronchial breathing over the whole right chest. Coarse râles.	———	"Lobar pneumonia." Friction rub. Clear pleural effusion.	Primary carcinoma of bronchus; lobar pneumonia. Healed apical tuberculosis.
14.	Dullness at both bases, with diminished fremitus and bronchovesicular breathing at the left base. Sibilant râles through both lungs.	Wide mediastinal shadow—probable aneurism.	Palpable liver. Pain in chest.	Primary carcinoma of bronchus. Bronchopneumonia. ? syphilitic aortitis.
15.	Dullness and bronchial breathing at the left apex; dullness, diminished breathing and râles through whole left back.	Increased density of entire left chest.	Dyspnoea, weakness, loss of weight.	Primary carcinoma, lobar pneumonia, multiple lung abscesses.
16.	Dullness in left axilla. Distant bronchial breathing and râles at the left base.	Massive pleural effusion with displacement of heart.	Cyanosis, edema of neck and chest. Clear pleural effusion.	Primary carcinoma of lung and mediastinum. Bronchopneumonia. Organizing pleuritis.
17.	Flatness and diminished breathing and fremitus at base of right lung.	———	Sero-sanguineous pleural effusion.	Primary carcinoma of lung.
18.	Dullness; bronchial breathing and diminished fremitus in left upper chest.	Increased density of whole left chest.	Pleural effusion turbid, later bloody.	Primary carcinoma of lung. Bronchiectasis. Pneumonia.

to hour. The mediastinal contents are displaced towards the lesion. Later, with massive tumor in the chest, flatness replaces dullness; hoarseness may result from pressure upon the recurrent laryngeal nerve, and inequality of pulses and pupils may be observed.

Adler[1] refers to "cornage", a sign which he considers pathognomonic of bronchial obstruction. He describes it as a sound similar to that heard over a partially compressed trachea, but occurring over the lung proper. In no case was the presence of this sign noted, but as it was not kept in mind at the time of examination further investigation of this sign should be made.

As the disease progresses the signs may demonstrate increasing infiltration, cavity formation

or effusion. Fever, leucocytosis, mild anemia, clubbing of the fingers and loss of weight are common. The sputum is usually bloody at some time in the course of the disease and may contain cancer cells.

Diagnosis: In a man past middle age, onset of pain in the chest, dyspnoea or hemoptysis, should lead to the suspicion of pulmonary neoplasm. The onset of symptoms may be insidious or fairly acute. A period of declining health and loss of body weight may, or may not, precede the pulmonary symptoms. The first symptoms recognized by the patient may be due to metastases.

The earliest physical signs are limitation of expansion, dullness and decreased breath sounds at one lung apex or at the hilus of the lungs posteriorly. As larger areas of lung become involved, the signs extend, remaining, however, unilateral and sharply defined. The signs often suggest encapsulated or free fluid, but displacement of the mediastinal contents is often absent or toward the affected side. Râles may, or may not, be present.

Tuberculosis is the first consideration in differential diagnosis. It should be emphasized that, in an advanced, tuberculous process accompanied by profuse expectoration, tubercle bacilli can almost always be found in the sputum. In tuberculosis, moreover, an extensive process in one lung is almost invariably associated with some disease of the other lung. Involvement of the middle or lower lobes exclusively speaks against tuberculosis. Tuberculous effusions are unusual in patients over forty years of age. Pain in tuberculous pleurisy is mild and disappears with the accumulation of fluid; dyspnoea is, as a rule, relieved by thoracentesis and fluid reaccumulates slowly and at a diminishing rate. The absence of fever argues against tuberculosis. The differential diagnosis between pulmonary tuberculosis and a malignant tumor is not always easy. Rarely the two conditions are present in the same individual.

SUMMARY AND CONCLUSIONS

In a man over 50 years of age the onset of cough with pain in the chest or hemoptysis should suggest cancer of the lung rather than tuberculosis.

The symptoms of greatest importance to the patient may be caused by metastases. By contrast, symptoms caused by the primary lesion may be inconspicuous.

A unilateral, sharply defined area of dullness and diminished breathing, suggestive of encapsulated fluid, may be due to cancer of the lung. Early in the disease examination of the chest may be negative.

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A SOLUTION OF RURAL HEALTH SERVICE IN MASSACHUSETTS*

BY GEORGE H. BIGELOW, M.D.,† AND WILSON W. KNOWLTON, M.D.†

DR. EUGENE R. KELLEY, former Commissioner of Public Health, was accustomed to say that the small communities in Massachusetts presented public health problems for which there was at present no satisfactory administrative solution. The larger cities and towns could afford competent service by a full-time staff if they were interested in getting it. But the small cities and towns could not afford it even if they had the desire. Dr. Kelley had worked out with the Public Health Service the Barnstable County Health Unit which persists as the only such county organization in New England. But he realized that in general the county was not a suitable unit here even though it was elsewhere in the country. The principal reason in Massachusetts is that for the most part the counties are far too populous and contain too many cities.

A year ago Dr. Ray Lyman Wilbur, a notable member of the President's Cabinet, was quoted in the press as saying that New England was backward in its health service for children. As if that were not enough, the *Journal of the American Public Health Association* wrote an editorial to the effect that the center of gravity of public health is leaving the northeast and passing south and west. All their reflections were based on the fact that we have not used the county as a unit of health service as has the rest of the country and have not developed any substitute.

Two years ago Governor Allen pointed out the advantages to education that had come from the grouping of towns in school districts for the employment of a properly trained full-time super-

*Massachusetts Department of Public Health.
†Bigelow—Commissioner of Public Health for Massachusetts. Knowlton—Massachusetts District Health Officer. For records and addresses of authors see "This Week's Issue", page 489.

intendent and recommended legislation allowing towns to combine in health districts for the employment of a full-time executive health officer and staff. Such a bill was introduced by Professor C. M. Hilliard of Simmons College and was passed by the Legislature. Although Lee, Lenox and Stockbridge have combined to give an admirable adequate milk inspection service, no towns have as yet combined for the all-round health service thus contemplated. Now along comes the Commonwealth Fund of New York with the aid and incentive necessary to promise real success.

Massachusetts and Tennessee are the two states selected for aid in developing rural health service. Nearly $100,000 will be put into this program here each year for three to five years. The following features of the Commonwealth Fund program show constructive thinking:

(1) *Education.* Funds for developing the teaching of preventive medicine in medical schools and postgraduate training for general practitioners engaged in rural practice will be available. Also, assistance will be given to some teacher training school in developing courses in health education.

(a) *Medical students.* About five scholarships will be offered in some Massachusetts medical school to students who will agree to practice following their hospital interneship for at least the first two years in a small community. If the recipient changes his mind he is asked to repay the loan; otherwise not.

(b) *Physicians.* Some fifteen physicians, largely selected from the health districts, will be given, each year, their tuition, travel and $1000 for four months' study. The Fund must approve the course and the school. The Fund is not interested in making specialists out of general practitioners, but it is deeply interested in encouraging study in various fields of general medicine, surgery, pediatrics and obstetrics. In this way men graduated some years since may become familiar with the more recent advances. Thus is recognized by a great foundation that in an informed medical profession is the basis of sound public health work.

(c) Certain scholarships will be offered public health nurses for postgraduate study in their many fields.

(d) Certain scholarships for teachers interested in health education will be available.

(2) *Coördinating Unit.* Funds will be made available for organizing a unit in the State Department of Public Health which will develop, advise and coördinate the activities of the health districts organized under this plan. This unit will be composed of a medical health officer, public health nurse and sanitary inspector.

(3) *Aid to Districts.* A limited number of health districts (two the first year) that develop programs and staff that seem to the Fund adequate will receive financial aid.

In addition to the above, the State Department of Public Health can contribute in suitable instances toward the salary of the local health officer by appointing him a part-time epidemiologist of the Department. It will be of great help not only to the local communities but to the entire state to have more trained health officers available for emergency service, in their respective localities.

Here then is given to us a plan adapted to our needs which will give our rural people this much needed skilled full-time service. Will they accept it? The forces working against it are community jealousies, inertia and suspicion. Those working for it are the disinterested professional and lay people who realize the shocking neglect in the application of precise knowledge available today for the reduction of sickness and death among the people. May we not be found wanting in making amends for past neglects now that the means have been given to us.

COSMAS PHARMACAL COMPANY

On August 14, 1930, a postal fraud order was issued against the Cosmas Pharmacal Company and M. Werner at Watertown, Wisconsin. This enterprise was the subject of a bulletin by this Bureau, issued October 11, 1924, which dealt with advertising by the company under the name of Miss Evelyn Reed.

The business consisted in the sale of a so-called "Galvano Goitre Appliance" in the form of a necklace and a salve and certain laxative tablets to be used in conjunction with it. The necklace, upon which F. C. Werner, M.D. (deceased) was granted a patent, consisted of a string of 58 yellow beads alternated with small zinc and copper disks. The salve, composed of hydrocarbon and a fatty base containing about 7% mercurous iodine, was supposed to be rubbed on the goitre and the necklace worn over it. It was claimed that this preposterous treatment would cure goitre!—*National Better Business Bureau, Inc., Commercial Department.*

BLACKTONGUE PREVENTIVE VALUE OF LARD, SALT PORK, DRIED GREEN PEAS, AND CANNED HADDOCK

For several years the Public Health Service has been conducting studies relating to nutritional diseases with particular reference to pellagra. A report recently made public indicates that the blacktongue preventive potency of lard, salt pork, dried green peas, and canned haddock has been studied. The results show that lard and salt pork are poor sources of the blacktongue preventive. Canned haddock contains the blacktongue preventive factor and, when used in relatively large proportion, the clinical manifestations of blacktongue are prevented. Dried green peas contain the blacktongue preventive but in relatively small amount. Fifty per cent or more of the test animals on the lard, salt pork, and haddock diets showed post-mortem evidence of fatty degeneration of the liver.—*United States Public Health Service.*

THE NEW HAMPSHIRE MEDICAL SOCIETY

SOME PHASES OF DENTISTRY WHICH SHOULD CONCERN THE MEDICAL PRACTITIONER*

BY OTIS M. LITTLEFIELD, D.M.D., MANCHESTER†

THIS paper presumes in no way to offer any striking new theories or debatable hypotheses but to consider a few phases of dentistry that are common to everyday practice.

Probably the most important phase of dentistry that concerns the medical practitioner is the association of dental disease with systemic disturbances.

Many articles have been written and several explanations have been offered to show the pathological sequences in focal infection but I dare not say which one is correct or that any one offered so far is correct yet all may be correct. However, the point is now reached when clinical evidence is established sufficiently to prove that dental disease does present foci of infection.

As medical men, being responsible for the health or a restoration to health, you are deeply concerned with any contributing cause of disease. As dentists, being responsible for maintaining dental health or eliminating dental disease, we are just as deeply concerned in relieving or preventing, if possible, chronic infection in our field.

Dental foci of infection are principally in the alveolus, that is, the damage comes through a chronic low grade infection of the alveolar process either at the apex of the tooth roots or around the surface of the roots between the apical area and the gingival or gum border. The reason, of course, that this distinction in locality is made is that in general a different disease attacks each area.

Periapical infection is usually the result of devitalization or extirpation of the dental pulp which in either case cuts off a considerable amount of nutrition from the tooth. Parietal infection, or infection around the root not involving the apical area, is usually the result of so-called pyorrhea. In this process of disease, part of the nutrition is destroyed but no doubt to a lesser degree than through the loss of pulp. Pyorrhea is always a chronic disease and while in one form it progresses faster than in another, it is marked by an insidious persistent rarifying or condensing osteitis and even though there is drainage through the pocket formed between the alveolar process and the tooth, it is difficult to believe that such a disease process is not at times a contributing factor of focal infection.

Periapical infection presents an osteitis either rarefying or condensing, but the etiology in this condition is such that there is apparently a slightly greater defense built up to localize the infection. Probably the most common evidence of this defense in the chronic type is represented by the formation of a granulation tissue termed according to dental nomenclature as a granuloma. At times this granuloma is inactive as a process of infection but yet it may at any time break down and become an active abscess (not acute, necessarily, but an active chronic abscess). Periapical condensing osteitis is very difficult to diagnose but from the standpoint of systemic disease is a dangerous lesion. It is dangerous because the blood supply becomes very limited and the defense is almost entirely cut off. While in some cases of periapical infection there is drainage through the open root canal or through a fistula the absorption or extension into the blood stream is abated but partially. With *no drainage* to the surface, infected bone is a very vicious enemy to the human organism.

Alveolar abscesses may enlarge or coalesce and form cysts but these are usually walled off by a layer of bone and are dangerous in that they may develop into malignancy, osteomyelitis or fracture.

Another disease of the alveolus that the medical and dental professions are jointly concerned in is the fusospirillary stomatitis or commonly called Vincent's infection. Please pardon the expression of a personal opinion but I am convinced that this disease, if at all advanced and perhaps in every case, should be handled by the medical man. He may give intravenous treatment, take a blood test and observe the patient's general reaction but the patient should be referred or sent back to the dentist for oral treatment. This is being done in the larger hospitals with fairly successful results. With intravenous treatment there is less liability for recurrence and in some cases the blood test reveals a *specific* infection. The local treatment consists of gently removing the exudate, cleaning so far as possible all debris from the teeth and applying spirocheticides. Oxidizing agents are prescribed for home use. Sodium perborate is probably most commonly used. There are several preparations for local application that are equally effective.

Dentistry for children presents a problem to both professions, principally in the handling of abscessed deciduous teeth. We, as dentists, are concerned in the normal development of the jaws and dental arch. We realize the importance of retaining these deciduous teeth until it is time for the permanent teeth to erupt in their

*Read at the Annual Meeting of the New Hampshire Medical Society, May 14, 1930 at Concord.

†Littlefield—Past President, New Hampshire Dental Society. For record and address of author see "This Week's Issue", page 489.

place. Yet these teeth are often bothersome to the child and if that child is showing malnutrition or maldevelopment, cervical adenitis, symptoms of chorea or in any way his general health is affected and draining of the abscess fails to give proper relief, it is considered good practice to take the lesser of two evils and extract the teeth. The policy of the various state public health clinics is to extract *all* abscessed deciduous teeth but of course that is a public clinic where a careful watch or check-up on the child is impossible.

Diet—I wish I could say something definite to you on diet. There is a vast amount of research going on in many institutions which no doubt will in the future furnish us valuable information. Dr. Percy Howe, foremost among the research men on diet in dentistry, stated recently that beyond keeping the calcium and phosphorus in proper balance and furnishing sufficient vitamines, especially vitamins A, C and D, he could say little. His experimenting has been confined to animals, therefore no amounts or percentages could be recommended for humans.

Our chief measures in preventive dentistry are to prevent advanced lesions by frequent examination, possibly more thorough examination to locate and properly fill small cavities, to select carefully our means of restoration in order that they will not be the cause of any further disease. Not long ago it was common practice to devitalize a tooth to provide a support for a bridge. That is not done today, in fact it is rare that a vital pulp that can be kept vital is disturbed. When we remove that pulp even if it is done under the most painstaking method, we are making the tooth a potential source of alveolar infection. It is extremely rare that a dentist today attempts to treat an abscessed tooth. We realize that it is almost impossible to maintain thoroughness in asepsis in the average dental office so we are compelled to turn to antisepsis and our results are unsatisfactory in too high a per cent. of our cases to warrant any attempt at devitalization except in very rare instances. In the treatment of abscessed teeth we depend on two kinds of antiseptics, first, those which are volatile and produce a mild antiseptic, second, those that by chemical action produce a more or less permanent antiseptic substance in the root of the tooth and surrounding tissues. It appears that the less permanent predominate.

Let us now consider a delicate matter, the procedure in handling the patient together. You as medical practitioners have a patient who in your opinion needs dental attention or that patient comes to you for treatment of some disease in which focal infection is a factor. Gentlemen, that patient is yours. You are responsible for his care. You are the only ones who can be responsible. We, as dentists, are limited by law as well as by experience to dental disabilities. Send that patient to the dentist for a thorough dental examination, including x-ray, transillumination and pulp test. Ask the dentist to report to you his findings and make that a part of your case history. Do not tell a patient to have his teeth out because he has a gold crown. By the way, a gold crown is not the worst hazard in a patient's mouth. Now I do not mean to advocate the indiscriminate use of gold crowns but in some cases a tooth can be kept vital longer and serve a person better than other restorations. I think most dentists would support me in saying that a well made gold crown in these certain cases is better than another restoration when the making of that restoration necessitates cutting into the tooth to endanger its vitality in order to make it retentive. The report of a dental examination should be very comprehensive and should give you at least the following information:

1. Number of devitalized teeth, and condition of root fillings, if any.
2. Number of abscessed teeth with possible apical infection.
3. Amount of caries, especially deep-seated cavities.
4. Amount of parietal infection.
5. Impactions, unerupted or supernumerary teeth with the apparent conditions of the tissues around them.
6. Cysts, enlarged roots or tumors.
7. The general appearance of the mouth as to the presence of calculus, the condition of the gingivae and soft tissues, anything at all suspicious such as leucoplakia, or abnormal growths, etc.
8. His recommendation for treatment from the dental standpoint.

He should not by any means give the report to the patient until the physician has properly reviewed the case. On the other hand, the physician should consult with the dentist if there is something controversial. This controversy *can be ironed* out to the patient's and everybody's satisfaction. Providing the patient goes back to the dentist for treatment, that dentist should be warned of any physical disability so that he may govern his work accordingly. This procedure may seem to some to be too academic and unnecessary but it is a procedure that will always *lead* at least to thoroughness.

While in the foregoing I have endeavored to omit technical detail as wisely suggested by your secretary I have tried to emphasize the following points:

1. We may not know the exact biological activity in oral focal infection but we do know it does exist.
2. That the majority of cases of apical infection and pyorrhea we see nearly every day are potential factors in systemic disease.

3. Sclerotic bone or infected condensing osteitis should not be overlooked where diagnosis is at all possible.
4. The treatment of Vincent's infection should be generally considered a medical case.
5. Dentistry is making an extreme effort to forestall pulp involvement, especially through education.
6. Definite procedure in handling cases together will be of great benefit to all.

In closing, I would like to quote Mead in his article "When to extract pulpless teeth":

1. All teeth showing evidence of periapical bone involvement.
2. All pulpless teeth in patients whose health is seriously endangered.
3. All pulpless teeth showing marked periodontal bone resorption (periodontoclasia).
4. All pulpless teeth directly bordering on the maxillary sinus.
5. All third molars when pulpless.
6. All pulpless teeth when the root formation precludes the possibility of a good root filling.
7. All pulpless deciduous teeth.

REFERENCE

Mead: Diseases of the Mouth, published by Mosby.

Discussion

Dr. William E. Reed, Nashua: This is the second admirable paper that I have heard presented to a medical society by Dr. Littlefield. I am sure that he has brought to our attention an important subject of which I personally know little. I think that Dr. Littlefield, in his modesty, has neglected to refer to one point, and that is this:—when we have a patient requiring the advice of the dentist it is our duty to send that patient to a *competent dentist*. He did stress one point, namely:—It is not enough, and in fact I believe it is criminal, for us to say to a patient, "You must have your teeth extracted because your health is poor"; we should leave that decision to the *competent dentist* to whom we send our patients.

His discussion of the pathology of teeth disturbances I think was of interest to us all. The question of teeth has been of more or less interest to me personally since about 1914 or 1915, and I cannot refrain from thinking of the tremendous advances that have been made in the treatment of focal infections resulting from dental diseases then and today. At that time I had a patient who was supposed to have a focal infection. He had had blood cultures, aspirations, basal metabolisms and other investigations. Dr. Thomas, of Boston, had been preaching to us the story of dental infection, and about that time Dr. Lewis, McKenzie's assistant, came to this country for the purpose of setting up electrocardiographs in different sections of the United States. He saw my patient, suggested that an x-ray of the teeth be taken, and insisted that the profile plates were of no value.

In the city of Boston it was a question where this might be done. My patient went to Dr. Cross, then director of the Forsyth Dental Infirmary, who consulted with his x-ray man, Dr. Ginley, now dead, and they decided to take an ordinary x-ray plate, cut it in small sections, rewrap it in paper and insert it inside the cheeks, which was done, and in that particular case an infected, impacted wisdom tooth was found. Dr. Lewis' diagnosis was neuritis of the phrenic nerve, which in my ignorance I had never heard of before, nor since; but the extraction of the tooth was followed by return to health.

I think of another thing that I have found in my own practice, or have since I heard Dr. Littlefield's first paper which was read at a staff meeting of the Hillsborough County General Hospital, which is this, that I have been able to recognize a few cases of Vincent's disease. Previously, I had been contented with the old diagnosis of stomatitis, and I would administer perborate and chromate, without benefit resulting to any marked degree. Since then I have had sense enough to send those patients to a dentist who developed proficiency in diagnosis even to the extent of making smears and looking at them under the microscope, with the result that cases which previously treated from a period of two weeks to two months, until they decided I was not of value to them, have obtained relief in the remarkably short time of six, eight, ten or twelve days.

Dr. D. C. Norton, Manchester: Our President has thanked Dr. Littlefield for his paper, and I want to congratulate the members on having heard such a comprehensive paper on dental focal infections.

I think in times past physicians have been apt to neglect patients suffering with low grade focal infections. We have disliked to see them around the office, and have called them whiners and neuroties; they came in with chronic stomach trouble, chronic low grade arthritis and neuritis, with their various aches and pains, and we have allowed them to shift for themselves, thereby filling up the offices of the osteopaths and the chiropractors, while we were not searching for the real cause of their low grade troubles.

Regarding Vincent's angina, I certainly believe we need the careful dentist to help us out. It is a mean thing to treat, and it cannot be done by the doctor unaided. I have seen two hospital cases in the last ten years die of Vincent's angina, which started around an abscessed tooth, in spite of doctors and dentists and all medical treatment.

Now just in passing, I have had several cases of Vincent's complicating tonsillectomy where abscessed or dead teeth have been extracted at the time tonsils were taken out. Personally, I think, from now on tonsils and teeth are coming out at two different sittings, because when you

get Vincent's started on a nice raw area following tonsillectomy it is no joke.

Slow, protracted convalescence in both surgical and medical cases I think sometimes can be hastened by examining the mouth. I know I have seen several cases of osteomyelitis that dragged and dragged, where removal of one or two teeth has seemed to turn the tide, and the patient has recovered in a short time afterwards.

I am very happy to say that the dental and medical professions are depending more and more upon each other. Fifteen years ago in Manchester if I suggested that a patient consult his dentist about a certain tooth or teeth that I thought might be causing trouble, the patient was told to go back and say that "I, the dentist, did that work, and I know it is all right," and now we refer patients to dentists, and the dentists say, "All right, we will x-ray the tooth and see whether it is all right or not," and things are much more pleasant than they were.

Some 10 or 12 years ago I spoke before the Dental Society of Manchester and I told the dentists at that time that so long as I was responsible for a patient's health a patient was my patient until I got through with him, because I had received so little support from the members of the dental profession in referring patients to their dentists, that I was going to select my own x-ray man and make my own diagnosis, with his help, and not refer them to their own dentist and still be responsible.

I also want to congratulate the dental profession, and suffering humanity in general, because root canals are not being filled now at the rate they were 10 years ago.

In closing, I want to make the prediction that, in the future, teeth that are now in the process of dying, that show changes in the pulp chamber, and slow reactions where we are positive we are dealing with focal infections, will be taken out before that process goes on two or three years and we have a large granuloma up in the alveolar process which is walled off. By that time the patient has suffered for a long time. We might just as well say that a tuberculous patient alive and walking around and "flitting hither and yon" is no danger to the community, whereas when he is dead his body should be burned immediately, as to say that a tooth that is in the process of dying is not a menace to the individual.

Dr. F. N. Rogers, Manchester: I feel that there is a great deal to be said on this important subject, and I want to second what Dr. Norton and Dr. Reed said about Dr. Littlefield, and also to congratulate the program committee for their foresight in placing Dr. Littlefield on the program.

There are a great many children brought to me with poor teeth, and usually the history of the case is that they do not eat well, the mothers cannot get them to take any nourishment except that which is soft, and most of them are milk fed children. There are two bad results: One is poor nutrition and the other is the mental effect that aching or tender teeth have on the child. The child knows what a visit to the dentist's office means, and very often he will not complain of toothache or complain of the fact that trying to chew hurts him, and he is punished sometimes for being contrary and not eating.

The vitamin intake that Dr. Littlefield mentioned is, I think, equally important to the mineral salts intake that should be in the child's diet.

I find that children whose teeth are decayed sometimes do not appear to suffer with ill health. Such a child is in good condition but the body of the teeth may be pretty well gone and the question arises whether those flat stumps should be extracted. They cannot be filled because there is no body to them. I have sent these children to their own dentists with the hope, perhaps the recommendation, that the stumps be painted with silver nitrate and thereby stop further decay.

I should like to ask Dr. Littlefield if that is still good practice? Some dentists refuse to do anything and tell the patients to go home.

Now, while on the subject of poor teeth, we ought also to have in our minds the prevention of poor teeth. Why is it that we have such poor teeth? I was very interested in a Syrian family in Manchester. There were the grandfather, the father and the children. The grandfather was a man between 70 and 75 years of age, and he had all of his teeth except one which he had broken off chewing nuts. He was not young but still he was able to hang by his teeth and support his own weight. The father had several fillings. He had been in this country about 12 years, and in this country the children had been born, and the children's teeth were about the same as the average child's teeth that you see. Inheritance seemed to have played no important part in the construction of the teeth. I think the condition of the grandfather's teeth is due largely to the effects of his early diet and the intense sunshine he got in Syria.

Dr. P. H. Greeley, Portsmouth: I would like to say a word regarding infected teeth. I have come to believe that the chronic case is not properly examined until the teeth are x-rayed for apical infection. I have learned that the usual visual examination is wholly inadequate and that with the finest looking teeth and alveolar processes there may be serious infection.

I speak particularly of apical infection because in this condition there is no other outlet except into the blood. In pyorrhea discharging into the mouth the patient is not being poisoned.

In this connection the subject of food is of the greatest importance. If in connection with dental clinics for children the necessity of eating properly to save those teeth could be properly impressed on these patients something of real value would be accomplished.

The use of white flour and white sugar which are very rich in carbohydrates but wholly lacking in minerals and vitamins makes it impossible to get these essential elements in sufficient quantity to maintain growth without absorption of the minerals of the teeth. We often see a marked example of this in pregnant women.

I am of the opinion that our teeth would go with us to the grave if demineralized food was cut out of our regimen. Especially would this be true if sun baths were added to aid those people who do not readily metabolize lime.

DR. T. W. LUCE, Portsmouth: I do not want to enter into the discussion of this valuable paper particularly, but I should like to speak of one thing which I think I have mentioned before: That the American doctors' contribution to American medical literature in the prerevolutionary age consists of one book on fractures and about 20 pamphlets which are museum pieces today, and one of those pamphlets, entitled "Diseases Caused by Decayed Teeth," was written by Benjamin Franklin before the Revolutionary War. In this pamphlet he says about all that has been said here this morning except what has been said about x-ray and diagnosis, and, of course, this man Vincent was born some years later. But the idea of focal infection or diseased teeth is pretty old. It went to sleep for about 150 years, and now we are talking the same thing that Benjamin Franklin talked and later Benjamin Rush talked about 150 years ago.

MISCELLANY

ANNUAL MEETING

The 140th Annual Meeting of the New Hampshire Medical Society will be held at Manchester on May 19 and 20, 1931.

Dr. H. A. Des Brisay has left Hanover and gone to his old home, Vancouver, B. C. to do research work.

BUREAU OF THE CENSUS

NEW HAMPSHIRE MORTALITY STATISTICS: 1929

Washington, D. C., September 1, 1930—The Department of Commerce announces there were 6,542 deaths in New Hampshire in 1929 as compared with 6,442 in 1928.

No death rates for 1929 have been computed because any rates based on population estimates made at this time would be unreliable and would have to be materially revised as soon as the 1930 census figures become available.

Increases in deaths in 1929 over those of the preceding years were from the following principal causes: Nephritis (473 to 531), diseases of the heart (1,372 to 1,390), pneumonia, all forms (424 to 462), and bronchitis (53 to 67).

Deaths from automobile accidents (excluding collision with railroad trains and street cars), increased from 76 to 98, and all accidental causes increased from 357 to 388, the types of accidents showing the greatest increases being accidental falls (81 to 101), railroad accidents, including collision with automobiles (4 to 12) and burns, conflagration excepted (13 to 17).

Significant among the decreases in deaths in 1929 were those from the following principal causes: Tuberculosis, all forms (307 to 237), cancer (640 to 621), and diabetes mellitus (127 to 114). Decreases were also shown from diseases of the arteries (258 to 244), diarrhea and enteritis (59 to 49), whooping cough (24 to 16) and deaths from accidental drowning, from 65 to 36.

VERMONT STATE MEDICAL SOCIETY

MISCELLANY

VERMONT DEPARTMENT OF PUBLIC HEALTH JULY, 1930

Communicable diseases have been reported during the month of July as follows: Chickenpox 21, diphtheria 9, measles 30, mumps 3, scarlet fever 13, whooping cough 46 and tuberculosis 18.

A total of 1,747 examinations were made by the Laboratory of Hygiene classified in the following manner:

Examination	
For diphtheria bacilli	138
For Widal reaction of typhoid fever	32
For malarial parasites	0
For tubercle bacilli	249
For evidence of syphilis	419
For gonococcus in pus	156
Of blood for contagious abortion in cattle	91
Of water, chemical and bacteriological	243
Of water, bacteriological	167
Of milk, market	94
Of milk, submitted for chemical only	0
Of milk, submitted for microscopical only	5
Of foods	1
Of drugs	0
For the courts, autopsies	5
For the courts, miscellaneous	57
Miscellaneous	87
Autopsies to complete death returns	3

In the Division of Poliomyelitis After-care, 133 patients have been seen, 174 home visits made, two doctors visited, 24 new pieces of apparatus fitted, 40 orthopedic corrections made to shoes, 19 pieces of apparatus altered or repaired and one patient admitted and discharged from the Children's Hospital. Twenty patients were seen by the vocational worker of this division and 19 home visits made. The vocational worker held sales during the month according to the following schedule: St. Johnsbury, Hyde Manor, Sudbury, Dorset, Arlington, Manchester. The total sales for the month amounting to $367.85.

The State Advisory Nurse of the Department of Maternity and Infancy held clinics in six towns of the state, with a total attendance of 233. Also talks have been given to mothers at Home Bureau meetings in several towns.

RUTLAND COUNTY NOTES

At a meeting of the Rutland County Medical Society held on July 9, 1930, the following officers were elected:

President: Dr. G. G. Marshall, Rutland.

Vice President: Dr. J. S. Martyn, Cuttingsville.

Secretary and Treasurer: Dr. B. F. Cook, Rutland.

Delegates to State Convention: Dr. Edward Rogers, Pittsford; Dr. Naomi Lanou, Rutland; Dr. Clarence Fagan, Rutland.

Auditor: Dr. Stewart Ross, Rutland.

Censors: Dr. Charles Joyce, Proctor; Dr. C. B. Ross, West Rutland; Dr. B. E Colby, Sudbury.

Dr. E. J. Rogers, Pittsford, Chairman of the Vermont State Board of Health, sailed August 2 on the "Oscar II" from New York as a delegate from the National Tuberculosis Association to attend the meeting of the International Union Against Tuberculosis which met in Oslo, Norway, August 13, 14 and 15.

VERMONT MORTALITY STATISTICS: 1929

Provisional Summary

Washington, D. C., August 18, 1930.—The Department of Commerce announces that there were 5,295 deaths in Vermont during 1929 as compared with 4,888 in 1928.

The causes which took the greatest toll of life were those diseases which affect persons of older ages, namely, diseases of the heart (1,092), cerebral hemorrhage and softening (516), cancer (465), and nephritis (445). The first two causes alone were responsible for nearly one-third of the deaths in the State.

The deaths from influenza in 1929 more than doubled the number in 1928, and other increases were from pneumonia, all forms, and diarrhea and enteritis under 2 years. Decreases were shown for tuberculosis, all forms, and diabetes mellitus.

Among the deaths from accidents, decreases appeared for drowning, machinery accidents, and automobile accidents, and increases for burns and shooting.—*Bureau of Census.*

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 16361

THE ABSENCE OF ACUTE SEVERE PAIN IN A CASE OF CORONARY THROMBOSIS WITH EXTENSIVE CARDIAC INFARCT

MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. ROBERT S. PALMER: This patient came into the hospital about two weeks ago. He was sent in by his physician with a diagnosis of heart failure.

The patient gave a history of having been under great nervous strain, and his own opinion was that his symptoms were due to nervousness. Beginning six months ago and since then he had very slight upper sternal oppression. He did not describe this sensation as pain. It was not severe. It did not radiate. It was relieved by rest and was constantly related to exertion. He had also been somewhat short of breath on exertion. The only other symptoms were marked fatigue and weakness during the six months. Beginning three weeks before entrance the patient was aware of additional dyspnea on exertion during the day and uncomfortable shortness of breath on lying down at night. This forced him to sit upright for relief, and at least once he was compelled to spend the night in a chair. This increased dyspnea was of gradual onset, did not occur in definite attacks and was unaccompanied by pain. It was this symptom of dyspnea which caused him to consult his physician, who found a systolic pressure of 90 millimeters of mercury and noted slight cyanosis of the nail beds. The patient had not required morphine at any time. He had had no edema of the feet or ankles. He denied cough, although in the hospital a dry cough was noted.

Physical examination showed a well developed man of fifty-eight. He had a slightly sallow complexion. The mucous membranes were of good color. The chest expanded normally. The lungs were resonant in the upper chest posteriorly, but at the bases there were definite râles on inspiration and some dullness. In the third space anteriorly were medium crepitant râles on cough and inspiration. The heart rate was 120. There was a slight systolic murmur at the apex. Palpation and percussion showed the cardiac borders to be within normal limits. The blood pressure was 90 systolic, 60 diastolic. It could be said that there was a suggestion of gallop rhythm, though it did not seem marked enough to comment upon.

The first electrocardiogram showed normal rhythm, rate 120, inverted T_1 and T_2, diphasic T_3. The T waves were of the cove plane type indicative of coronary disease. This was also seen in the second tracing, and there was a slightly high origin of T_3 and low origin of T_1. The temperature ran to 100° or slightly over in swings of 2° each day. The white count on admission was 25,000.

We made an initial diagnosis of mild angina on the basis of coronary sclerosis. An X-ray film showed marked pulmonary congestion which was interpreted as of cardiac origin. The heart shadow was not enlarged.

It did not seem to me that a man of such a nervous type as this patient could have had an extensive enough infarct on the basis of a coronary thrombosis to cause a continued fever and a high white count after two or possibly three weeks. Moreover I did not think a slow occlusion could cause an extensive enough necrosis to give this fever and leukocytosis without causing pain. The swings of temperature and leukocytosis finally made me consider a pulmonary infection as a possible cause of the acute symptoms.

The patient was seen by Dr. Paul D. White, who made the diagnosis of coronary thrombosis, though he commented on the fact of the very atypical history. He was also seen by Dr. Richard B. King for the question of pulmonary disease. He also diagnosed coronary thrombosis and gave an absolutely bad prognosis.

The patient seemed to get better. The temperature came down and the white count fell. In spite of theoretical digitalization, however, the pulse continued rapid. The patient was extremely depressed, talked of suicide and felt badly off in general on a sentence of absolute bed care. After a few days, in order to improve his morale and because of painful hemorrhoids which had developed in the meantime, he was very gingerly put in a chair. We felt that this would promote our object of absolute quiet more successfully than insisting on his remaining in bed, where he was throwing his feet around, sitting up and constantly changing his position. After a short time, against orders he began easing himself out of bed. This was four weeks after the dyspnea became worse. The family had been warned that he might die suddenly, but he was told that there were definite signs of improvement, as there seemed to be.

One morning the orderly came in to change him. He joked with the orderly, threw his legs out of bed, then stared, put his hand to his head, fell back and died after a few gasps. Dr. Wood was passing, and within three minutes went into the room and listened over the precordium. He heard no heart sounds. The pulse

could not be felt. The gasps continued for three or four minutes.

The possible causes of death might have been cerebral or pulmonary embolism from a left ventricular mural thrombus, rupture of the heart or a sudden disordered ventricular rhythm, possibly ventricular fibrillation.

Clinical Discussion

Dr. Paul D. White: I saw this patient with Dr. Palmer. He has spoken of the difficulty in diagnosis, but has emphasized mostly the points that made us lean toward coronary thrombosis. Although we did make a fairly definite diagnosis of coronary thrombosis after considering all the evidence, there was at first a very strong possibility of there being a respiratory infection, at least as a complication of angina pectoris. The X-ray showed generalized increase in the lung markings, which was a bit confusing at first although on careful consideration this finding was believed to be more consistent with pulmonary vascular congestion than with infection. Physical examination showed râles, mostly dry in character, scattered throughout both lungs, also a somewhat unusual finding except with acute left heart failure, asthma, or infection. There was no edema anywhere else at that time. He had a temperature which seemed to have been maintained overlong (three weeks plus) for a case of coronary thrombosis. Weakness and dyspnea were the chief symptoms, especially the latter. There were, however, two points that made us feel quite sure of coronary thrombosis here. (1) The electrocardiogram showed evidence which was very strong, consisting of the so-called coronary *T* waves in leads 1 and 2. (2) The heart sounds were abnormal. I do not think Dr. Palmer emphasized as much as I would have done the rather poor quality of the heart sounds, which finding I would not expect with a respiratory infection. There was a slight but definite protodiastolic gallop rhythm, not at all prominent and yet clear.

Having made the diagnosis of coronary thrombosis we felt that the duration of fever, prolonged and developing from the first, made the prognosis very doubtful even though the patient seemed to be in fair condition. Of course we cannot determine the exact cause of the sudden death, but it was probably abrupt cardiac standstill, which doubtless occurs in some cases of sudden death in coronary thrombosis without necessarily any abnormal rhythm, like ventricular fibrillation.

Dr. James H. Means: I was wondering if this could be coronary disease not primarily thrombosis. He might have a narrow coronary because of sclerosis, which might perhaps account for the six months' story of oppression and dyspnea, and he could have a relatively trivial thrombosis at the end which in a narrow coronary would be enough to kill him. I think the low blood pressure and the continuance of the tachycardia after digitalization are interesting points. Those things put together make us think of coronary disease of some sort, but I wonder if a chronic type of narrow coronary would explain it better than acute thrombosis.

Dr. White: That would be quite possible if it were not for the continued leukocytosis and the abnormal electrocardiogram, which is more typical of thrombosis than of simple narrowing of the coronary arteries.

Dr. Means: I was accepting the leukocytosis as probably of pulmonary origin.

Clinical Diagnoses

Coronary occlusion.

Rupture of the heart? Pulmonary or cerebral embolism? Ventricular fibrillation or acute standstill of the cardiac mechanism?

Anatomic Diagnoses

1. *Primary disease.*

Cardiac infarct.

Sclerosis and calcification of the left coronary artery with practically complete occlusion.

Thrombosis of the left coronary artery.

2. *Secondary or terminal lesions.*

Edema of the lungs.

Pathologic Discussion

Dr. Tracy B. Mallory: The autopsy showed a very extensive infarct of the heart. It involves a very considerable portion of the left ventricle, including nearly half the interventricular septum. It seems rather surprising that he did not show intraventricular block with such an extensive lesion in the septum. The process is still fairly fresh. I cannot give any exact dates on it, but should guess at a duration of two weeks to a month. There are many yellow areas of necrosis still quite evident, though as yet comparatively little scarring. The heart was not hypertrophied; it was quite within normal limits. The left coronary artery showed a considerable degree of sclerosis and at one point about two centimeters from the orifice it was very calcified and totally occluded, and there was a rather fresh thrombus.

The other findings in the case were all essentially negative. There was a very diffuse type of pulmonary congestion,—edema of the lungs throughout all lobes and the dependent portions. The lungs were less crepitant than normal but there was no evidence anywhere of pneumonia. The blood culture has not been reported yet, but I imagine it will be negative. I examined the brain and found no major emboli, though there were enough thrombi at the apex over one part of the infarct so that embolism is a perfectly good possibility.

Dr. White: You found no embolism anywhere else?

Dr. Mallory: No.

DR. PALMER: Dr. White, do you think the electrocardiograms in this case could be consistent with chronic coronary disease in a person with mild angina, and could not necessarily mean more than that?

DR. WHITE: As I said before, the electrocardiogram is pretty strong evidence of myocardial infarction. It is very rare to get such changes in an electrocardiographic examination from coronary narrowing alone. I think the heart sounds also were important evidence; in angina pectoris the heart sounds usually remain good. Also there is the low blood pressure in this case, which is of some importance, although some people carry normally a low blood pressure and in the presence of infection it becomes lower.

DR. MALLORY: What proportion of cases of cardiac infarct have preceding hypertension?

DR. EDWARD F. BLAND: We have recently analyzed 500 cases of angina pectoris and have found about 180 with hypertension; there has been about the same incidence in a series of 200 cases of coronary thrombosis.

CASE 16362

A FULMINATING RESPIRATORY INFECTION FOUR WEEKS AFTER MEASLES

CHILDREN'S MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. RALPH W. DAFFINEE*: A three year old girl of Polish parentage entered the hospital on May 13 with the chief complaint of cough and pain in the right chest.

Family history. The father and mother were both in excellent health. There had been no other pregnancies. A maternal uncle who had been living with the family was suspected to be tuberculous.

Past history. Except for pertussis at eighteen months the child had been well. Her development was normal.

Present illness. Four weeks previously she had measles. The attack was not particularly severe, and the child was up and about within two weeks. The cough however persisted.

On May 11 the child woke suddenly from her afternoon nap and complained of pain in the right chest below the scapula. There seemed to be fever, and she vomited once or twice. The cough did not change in character.

She had a very restless night and was no better the next morning, May 12. A physician was called; he found signs of pneumonia, with a temperature of 106°; he left some medicine. The child had lost her appetite, and refused to take anything excepting a little milk.

On the morning of May 13 she seemed worse. The parents noticed that the respirations were more rapid and that the child was blue. The physician called again, found signs of fluid in the chest, and sent the child to the hospital.

Physical examination. On entry she seemed in very poor condition; she was irrational, dyspneic, restless and apprehensive. Her face was ashen, her extremities cyanotic. Her temperature was 104°. She tended to lie on her right side. The head was moist with perspiration. There were dry crusts in the nose. The throat was red and contained mucus. The ears were normal. On the right side of the chest there was limitation of motion; tactile fremitus was absent; the percussion note was flat over the entire side. On the left side there was definite retraction of the interspaces with inspiration, the breath sounds were increased in intensity and occasional moist râles were heard.

The pulse rate was 130 per minute. The heart sounds were faint. The apex beat was felt 2.5 centimeters outside the nipple line. The abdomen showed moderate distention.

Course in the hospital. The child was put into an oxygen tent and given 1/24 grain of morphine. The cyanosis persisted. Respiratory embarrassment seemed to become more marked. A chest tap was done and pus obtained. The child ceased breathing and the heart stopped suddenly just as the thoracentesis was being done.

Death occurred two and one-half hours after admission to the hospital. Smear and culture of the chest fluid showed non-hemolytic streptococcus.

CLINICAL DISCUSSION

BY HAROLD L. HIGGINS, M.D.

This is the story of a pneumonia with a virulent organism and the occurrence of empyema within perhaps forty hours of the onset of the pneumonia. It is quite possible to have a chest fill with pus within a few hours, but I think it is unusual to get empyema developing so soon after the onset of pneumonia. The reason for that in this case may be that the child had had measles and her resistance was diminished. I am inclined to feel that there was a preëxisting pleuritis. It is possible with the septicemia of the pneumonia that the bacteria centered in the diseased pleural tissue and pus formed.

The organism in this case is reported to be a non-hemolytic streptococcus. The usual organism in serious and fatal post-measles pneumonia is the hemolytic streptococcus. I should like to ask Dr. King if it is at all common for the non-hemolytic streptococcus to cause so virulent an infection.

Another important problem is raised in the treatment. The child came to the hospital obviously in extremis. She was so very sick that immediate measures were taken to try to relieve the respiratory embarrassment and over-

*Resident on the Children's Medical Service.

come the cyanosis. She was given morphine and put in an oxygen tent, but that method of treatment did not succeed in relieving her. As the condition was becoming worse it was felt that perhaps a thoracentesis might be of help. That was tried. At almost the exact moment that the needle went into the chest she stopped breathing and died.

There are two types of sudden death in empyema. (1) There is the child who dies just as the needle is put in or even shortly before it is put in, while the child is being restrained. In these cases death would probably have occurred within a few hours in any event. This case falls into this group. While one does not like to have a death occur during a treatment, yet I think that the doctor who decided to give this treatment is not open to criticism for trying this method as a last resort to relieve the child. (2) There are sudden deaths from empyema which occur after a considerable amount of fluid, perhaps 100 cubic centimeters or more, has been withdrawn. One feels more disturbed in such cases, as the question arises if they might have been prevented.

CLINICAL DIAGNOSES

Empyema.
Bronchopneumonia.

ANATOMIC DIAGNOSES

Tuberculosis of the bronchial lymph nodes.
Tuberculous ulceration of the right bronchus.
Tuberculosis of the right lung with cavity formation.
Tuberculous pneumonia, right lung.
Empyema, right pleural cavity.

Pathologic Discussion

Dr. Merrill J. King: Autopsy was restricted to the thorax. The right pleural cavity contained 500 cubic centimeters of thin purulent yellowish fluid. The left was negative. All the bronchial lymph nodes were enlarged, more particularly those on the right. One of these measured 3 by 2 by 2 centimeters. On section they showed caseous areas. A branch of the right bronchus leading to the right lower lobe showed an ulcerated area opening into one of these caseous nodes. The right lower lobe was firm and non-crepitant. Section showed a small cavity 2 by 1 centimeters in size. The surrounding lung tissue was firm and homogeneous.

The heart was negative.

The question arises as to whether this was a non-hemolytic streptococcus empyema or whether it was originally tuberculous and secondarily became infected with non-hemolytic streptococcus. Probably this is what happened. In the last edition of Bergey's Manual he says that the non-hemolytic streptococcus may be pathogenic for man and can cause virulent pyogenic infection. Unfortunately the pleural fluid was not examined for tubercle bacilli, so we are not sure whether or not this was a tuberculous empyema. Undoubtedly the child had had a tuberculous infection for some time. The wall of the cavity shows granulation tissue with fibrosis. The Pathologic Department feels that the cause of death was primarily the tuberculosis, and does not I think lay much emphasis on the non-hemolytic streptococcus.

Dr. Joseph Garland: Can you rule out a pneumonia which existed longer than the period since the apparent onset here? The child had measles four weeks before death and had persistent cough. The only thing against a bronchopneumonia is that a week or two before the illness the child was up and about. Of course we see children of this age up and about with worse things than pneumonia. Much depends on the accuracy of the parents' observation.

Dr. King: Sections of the right lower lobe show a considerable amount of atelectasis and early tuberculous pneumonia with caseous necrosis of the wall of the cavity, collections of large endothelial cells and a number of giant cells.

Dr. Garland: No pneumonic consolidation?

Dr. King: None other than the tuberculous pneumonia.

Dr. Higgins: Was the fluid a pus of pyogenic origin or tuberculous pus?

Dr. King: I can find no one who saw a differential on the fluid, and we have no record of its nature. However, we are all inclined to feel that the non-hemolytic streptococcus was merely a secondary invader.

NOTE BY DR. HIGGINS

This case forcibly brings to our attention the fact that tuberculosis may cause unlooked-for signs and symptoms.

It would appear that the attack of measles four weeks previously was responsible for the caseation of the tuberculous glands and for the tuberculosis becoming active. The emptying of the caseous gland into the bronchus doubtless marked the onset of the tuberculous pneumonia.

The patient with tuberculous pneumonia may have quite as severe symptoms as the patient with pneumonia caused by the pneumococcus. The diagnosis may be made by the history of tuberculosis, the signs of tuberculosis elsewhere than in the lungs, the presence of tubercle bacilli in the sputum, a positive tuberculin test and a prolonged course not ending by crisis. In this case the two hours and a half the child was under observation was much too short a time in which to expect a clinical diagnosis of tuberculous pneumonia, and the finding of streptococci in the empyema fluid certainly was misleading.

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MEDICAL FEE-SPLITTING

THE *Boston Herald*, on August 25, published an editorial under the above heading dealing with the differing attitudes on fee-splitting adopted by the State of Wisconsin and the medical economics committee of the Medical Editors' Association. The State of Wisconsin holds that a doctor who is a party to the practice, whether openly or secretly, is guilty of criminal fraud and liable to fine and imprisonment and the loss of his license to practice.

The committee of the Medical Editors' Association, which has spent a year in the study of fee-splitting, recommends not that fee-splitting shall be abolished, for that is obviously impossible, but that secrecy shall be abolished. By the removal of secrecy, it believes, much of the evil of the practice will automatically cease. If both the practitioner's part in making the diagnosis and the surgeon's in performing the operation have open recognition, the temptation to exploit a patient will be reduced and the implication of shady practices will be removed.

There is no question that the practice of fee-splitting is widespread; more so in some localities than in others. In Massachusetts we pride ourselves that it is as little prevalent as anywhere. It would be folly to deny that it does exist to some extent. Before seeing clearly to the root of the matter, however, and understanding what ethical standards should demand, it is necessary to have a fairly exact definition of fee-splitting. If Dr. A asks Dr. B to see certain patients for him during his absence, is there any reason why he should not include Dr. B's charges in his own statement? Certainly there is nothing ethically wrong in such a practice; Dr. A does not benefit; he is simply offering a convenience to both Dr. B and the patient. The Medical Editors' Association would agree to this, but it is not clear as to what attitude the State of Wisconsin would adopt. On the other hand, if Dr. B, a surgeon, is asked by Dr. A to see a patient in Dr. A's office, is there any reason why Dr. A should not in this instance, also, make a separate charge for Dr. B in his statement? There seems nothing ethically wrong in this.

All we are after is to abolish practices which are "susceptible to great abuses, to such practices as traffic in sickness, the sale of operations to the highest bidder, often the performance of unnecessary operations."

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

MORRISON, L. B. M.D. University of Vermont College of Medicine 1902. Roentgenologist, New England Deaconess Hospital, Robert Bent Brigham Hospital, New England Baptist Hospital and Faulkner Hospital. Consultant, Huntington Memorial Hospital. His subject is: "The Rôle of X-ray in the Diagnosis of Carcinoma of the Colon." Page 441. Address: 370 Marlborough Street, Boston.

RICHARDSON, EDWARD P. A.B., M.D. Harvard 1906. F.A.C.S. John Homans Professor of Surgery, Harvard Medical School. Chief, West Surgical Service, Massachusetts General Hospital. His subject is: "The Diagnosis and Principles of Treatment of Carcinoma of the Colon." Page 455. Address: Massachusetts General Hospital, Boston.

JONES, DANIEL F. A.B., M.D. Harvard 1896. F.A.C.S. Surgeon-in-Chief, Palmer Memorial Hospital. Consulting Surgeon, Massachusetts General Hospital and the New England Deaconess Hospital. Associate in Surgery, Harvard Medical School. His subject is: "Diverticulitis of the Colon. Its Relation to Carcinoma." Page 459. Address: 195 Beacon Street, Boston.

CHEEVER, DAVID. A.B., M.D. Harvard 1901. F.A.C.S. Surgeon, Peter Bent Brigham Hos-

pital. Associate Professor of Surgery, Harvard Medical School. His subject is: "The Results of Treatment of Carcinoma of the Colon at the Peter Bent Brigham Hospital, Boston." Page 462. Address: 193 Marlborough Street, Boston.

COLBY, FLETCHER H. B.S., M.D. Harvard 1918. Assistant Urologist, Massachusetts General Hospital. Surgeon to Out-Patients, Palmer Memorial Hospital. Assistant Surgeon, Collis P. Huntington Memorial Hospital. Assistant in Genito-Urinary Surgery, Harvard Medical School. His subject is: "Intravenous Urography." Page 470. Address: 6 Commonwealth Avenue, Boston.

FREMONT-SMITH, MAURICE. A.B., M.D. Harvard 1918. Instructor, Harvard Medical School. Junior Visiting Physician, Boston City Hospital. Address: 264 Beacon Street, Boston, Mass. Associated with him is:

LERMAN, J. A.B., M.D. Harvard 1927. Research Fellow in Medicine, Harvard Medical School. Assistant in Medicine, Harvard Medical School. In charge of Metabolism Laboratory, Massachusetts General Hospital. Address: Massachusetts General Hospital, Boston. And

ROSAHN, P. D. M.D. University and Bellevue Hospital Medical College 1928. Address: New York City. Their subject is: "Primary Carcinoma of the Lung. A Study of 18 Autopsied Cases." Page 473.

BIGELOW, GEORGE H. A.B., M.D. Harvard 1916. Doctor of Public Health 1921. Commissioner of Public Health for Massachusetts. Address: State House, Boston. Associated with him is:

KNOWLTON, WILSON W. B.S., M.D. Harvard 1926. State District Health Officer. Address: 109 Broad Street, Lynn. Their subject is: "A Solution of Rural Health Service in Massachusetts." Page 477.

LITTLEFIELD, OTIS M. D.M.D. Tufts 1917. Past President, N. H. Dental Society. Assistant Instructor in Periodontia, Tufts Dental School 1925-27. His subject is: "Some Phases of Dentistry Which Should Concern the Medical Practitioner." Page 479. Address: 913 Elm Street, Manchester, N. H.

THE BOSTON MEDICAL LIBRARY

SIR ASTLEY COOPER, 1768-1841

SUCCESS in the practice of medicine seems to rest upon various grounds, ascribing to the word "success" the meaning commonly accorded it in everyday use in the practice of a profession, viz.: that of possessing a considerable following. The discovery of a principle fundamental to practice constitutes one kind of success. The demonstration of a causative factor or factors in the etiology of disease ensures success for the discoverer. An understanding and confident professional attitude which in turn inspires confidence in one's patients makes one a successful practitioner. The latter attribute is often the sole asset of the charlatan and *he* achieves for a time a certain success. The principle, which seemed to actuate Sir Astley Cooper's attitude toward his clientele and is so stated by himself in a personal estimate he once wrote in the third person, was this: "Never to suffer any who consulted him to quit him without giving them satisfaction on the nature and proper treatment of their case." Very few surgeons have been so prominently before the public as he and, as might be expected, he is reputed to have had one of the largest practices any surgeon ever secured. In one year his income, from practice alone, was 21,000 pounds. That in itself is also sometimes considered a measure of success.

Astley Cooper was the fourth son born to his parents. His father, Samuel Cooper was the curate of Great Yarmouth and rector of Morley in Norfolk. His mother was a woman of some literary ability and his eldest brother was for twelve years a member of Parliament from Gloucester. Astley Cooper was born at Brooke Hall, near Norwich on the twenty-third of August, 1768. His grandfather was a surgeon of some repute and he also had an uncle, William Cooper, who was surgeon to Guy's Hospital. As a youth he was not very industrious and perhaps for this reason received most of his schooling at home. In 1784 he was apprenticed to his uncle but was shortly transferred to Henry Cline at St. Thomas'. The winter of 1787-88 he spent at the University of Edinburgh Medical School, studying with Black, Fyfe, Cullen and Gregory. He also took John Hunter's lectures. In 1789 he received an appointment as demonstrator of anatomy at St. Thomas', when he was twenty-one years of age. At twenty-three Cline had him appointed to the lectureship on anatomy and surgery jointly with himself. In 1791 he married a young woman with a considerable fortune and shortly after this he spent some time in Paris. Upon his return he devoted himself to surgery and teaching and developed the clinical lecture type of instruction, drawing his material from his own surgical experience. From 1793 to 1796 he was a very popular lecturer on anatomy at the College of Surgeons. After Cooper's uncle resigned from Guy's Hospital, Astley Cooper was appointed surgeon in his stead and from that time on his practice increased very rapidly. As a result of a paper he presented before the Royal Society upon the membrana tympani he was awarded the coveted honor of an election to membership in this distinguished Society. He was an indefatigable worker, rising early to dissect, saying that that

day was lost in which he did not dissect something. He took every opportunity that was offered to study pathological specimens that were brought him and perform autopsies. His enthusiasm in these matters several times resulted in his being identified with the "Resurrectionists" and on one occasion, when he appeared before a parliamentary committee that was considering the activities of these outlaws, he said: "There is no person, let his situation in life be what it may, whom, if I were disposed to dissect I could not obtain. The law only enhances the price and does not prevent the exhumation." Cooper played an important part in 1805 in founding the Medico-Chirurgical Society and was its first treasurer. In 1804 he published his first important work, that upon Hernia. In 1813 he was appointed lecturer on comparative anatomy at the Royal College of Surgeons, and it was about this time that he startled the surgical world by ligating the aorta for an aneurism. His surgical reputation had secured for him distinguished patronage through Lord Liverpool, whom he had attended for a number of years. He was called upon to perform a minor operation upon George the Fourth. It was in recognition of this that he received his Baronetcy. In 1822 he published his valuable work on "Dislocations and Fractures of the Joints." Supposing that his nephew would receive the appointment to the lectureship at St. Thomas' he had so long held, he resigned but when he learned that the Governors of the Hospital had appointed another he persuaded the authorities at Guy's to create lectureships in surgery and anatomy and appoint his nephew to the latter chair. He also set about creating a museum there and provided it with specimens, St. Thomas' having refused to part with the collection he had made for them. In 1827 he became President of the Royal College of Surgeons and in 1828 was appointed surgeon to the King. After his first wife's death he temporarily retired to his estate in Gadesbridge but in the spring of the year following he returned to his practice and to the publication of several works of importance. In 1828 he married a second time. He was elected for a second term in 1836, to the Presidency of the College of Surgeons. Five years later (1841), in his seventy-third year, he died and was buried at his own request beneath the Chapel of Guy's Hospital. After his death the *Quarterly Review* in an appraisal of his character said that he was "a shrewd, intelligent man of robust, vigorous faculties, sharp set upon the world and its interests". He was not classed as a man of genius, nor even of truly scientific attainments but as a successful practitioner of surgery and an inspiring teacher with a personality that attracted all men to him and in a large measure accounted for his success. Many Americans came under the spell of his influence during their student days in London.

MISCELLANY

SCIENTISTS WILL STUDY BACTERIOLOGY AT SVALBARD

The Rockefeller Foundation has sent a group of research workers under Dr. John H. Paul to Svalbard, Spitzbergen, for the purpose of prosecuting bacteriological studies relating to respiratory diseases.

The Norwegian Government is coöperating with the Rockefeller Foundation in this study.

Under Professor W. G. Smillie, the foundation has previously authorized studies of a similar nature in Labrador.

BOSTON SMOKE CONDITIONS BETTER THAN THOSE OF NEW YORK

PARTS OF A LETTER IN THE NEW YORK TIMES

To the Editor of *The New York Times:*

It is interesting to learn that the Health Department has finally become aware of what most New Yorkers have known for several years—that the city is dirty as a result of smoke from soft coal and oil.

* * * * * *

While the inspectors are sweeping the sky from the skyscrapers, why not send some competent assistant to Boston and see how they manage it up there. Boston is clean. You can spend a day in the city and when you wash your face before dinner the wash cloth is clean, not nearly black from coal dust. . . .

THE CHILDREN'S ISLAND SANITARIUM

The Children's Island Sanitarium, situated on Lowell Island, Marblehead, is enjoying one of the most successful seasons in its history. The 94 children from 2 to 12 years of age who are patients are responding well to the treatment and their recovery from various ailments is being aided greatly by means of the salt water swimming pool.

The ocean water which is pumped into the tank daily and warmed to a temperature considerably above that of the sea is proving of inestimable value in restoring vigor to the little bodies that have been weakened through long sieges of illness.

Eighteen volunteer workers who have been carefully chosen by the Superintendent, Miss Elsie Wulkop, for their qualifications for this work, assist the nursing staff in ministering to the children. These workers come from several women's colleges and schools as well as from the members of the Junior League. All are interested in the care of children and are eager to contribute their time and skill towards the work of the Sanitarium. Instruction in basket-making, sewing and other manual arts is given by an occupational therapist. The staff also includes a dental hygienist and a physiotherapist.

The present medical staff of the institution includes: Dr. Lloyd T. Brown, chairman; Dr. George

P. Denny; Dr. Loring T. Swaim; Dr. Harry C. Low; Dr. Harry M. Lowd; Dr. Sumner M. Roberts.

The children are afflicted with tubercular joints, the after effects of infantile paralysis, malnutrition, and other maladies. The outdoor life on Lowell Island is an example of how nature can be induced to perform a rebuilding task in the shortest space of time—for invalided youngsters soon become joyful, animated boys and limping little girls become active, with pains and aches forgotten.

Besides the periods of rest and play, the physiotherapist gives individual treatment for better development of parts of the body especially needing such exercises.

The Sanitarium was founded about 45 years ago by a group of Bostonians. It is a private charitable agency and public spirited citizens have generously contributed to its needs since it receives no aid from the cities and state.

The officers of the Children's Island Sanitarium include: President, Mr. George S. West; vice president, Mr. Samuel Vaughan; secretary, Mr. Roger Amory; treasurer, Mr. Augustus Hemenway Jr.; Superintendent, Miss Elsie Wulkop. The officers and the following people comprise the Board of Directors: Dr. Lloyd T. Brown, Mr. Frederick J. Bradlee, Jr., Mrs. Leslie B. Cutler, Mrs. F. B. Crowninshield, Mr. Roger Griswold, Mr. Edward M. Pickman, Mr. John Reece, Dr. Loring T. Swaim, Mr. Robert M. Tappan, and Mrs. R. M. Tappan.

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1929 AND SEVEN-YEAR AVERAGE

MONTH ENDING AUGUST 23, 1930

Diseases	1930 Week ending Aug. 2	1930 Week ending Aug. 9	1930 Week ending Aug. 16	1930 Week ending Aug. 23	Average cases reported for week corresponding to Aug. 23 for past seven years	1929 Week ending Aug. 3	1929 Week ending Aug. 10	1929 Week ending Aug. 17	1929 Week ending Aug. 24
Anthrax	—	—	—	—	—	1	—	—	—
Cerebrospinal Meningitis	2	—	—	1	—	—	2	1	—
Chickenpox	12	2	4	3	4	43	9	4	6
Diphtheria	4	5	4	10	16	12	16	15	9
Dysentery Bacillary	—	—	—	—	—	—	—	—	1
Encephalitis Epidemic	—	—	—	1	—	—	—	—	—
Favus	—	—	—	—	—	—	—	1	—
German Measles	2	3	2	1	1	1	13	—	1
Influenza	1	—	—	—	—	1	—	4	—
Malaria	1	—	1	—	1	—	—	—	—
Measles	10	8	11	6	12	36	11	8	17
Mumps	8	4	8	8	5	7	5	2	—
Pneumonia (Broncho)*	10	4	5	3	7	7	14	6	7
Pneumonia (Lobar)	5	4	7	6	5	14	9	1	7
Poliomyelitis	1	—	1	2	5	—	2	—	2
Scarlet Fever	7	8	5	4	10	11	16	7	7
Septic Sore Throat	1	2	—	—	4	2	—	1	—
Smallpox	—	—	—	—	2	—	—	—	—
Trachoma	—	—	—	—	—	—	—	1	—
Trichinosis	3	1	—	—	—	—	—	—	—
Tuberculosis (Pulmonary)	32	10	28	25	25	30	14	40	22
Tuberculosis (O. F.)	2	1	4	1	3	—	3	2	4
Typhoid Fever	2	—	1	2	8	10	5	3	5
Whooping Cough	45	30	36	22	43	36	13	18	28
Gonorrhoea	42	30	45	21	23	40	31	30	25
Syphilis	59	30	61	21	25	44	26	14	32

Remarks: No cases of Asiatic cholera, glanders, plague, rabies in humans and yellow fever during the past seven years.

*Made reportable January 1, 1925.

EXCERPT FROM THE BULLETIN OF THE DEPARTMENT OF PUBLIC HEALTH, LYNN, MASSACHUSETTS, MAY, 1930

JAMES A. DUMAS, M.D., COMMISSIONER

Diphtheria is justly regarded as one of the most dreaded diseases of childhood. It causes more deaths in children between the ages of five and nine than any other disease. In children under five years of age, one out of every seven cases of diphtheria dies.

In this community for the year 1929, of 193 cases reported, 19 died, a mortality of 10 per cent. At the Isolation Hospital last year, diphtheria was responsible for 70 per cent. of the total deaths from all communicable diseases. These facts certainly call for vigorous action on the part of the Health Department and the physicians of Lynn in an attempt to cut down the incidence and lessen the mortality of the disease.

THE POISON IN GINGER EXTRACT NOT DEFINED

A published report of the study of the poisonous effect of some constituent of ginger extract used as a beverage thereby causing disaster to many persons is to the effect that physicians of the U. S. Public Health Service are unable to isolate and classify the deleterious agent, although the suggestion is made that it appears to resemble a phosphoric acid ester or tricresol.

THE ADAMS NERVINE

About sixty years ago Mr. Seth Adams, a Boston merchant, made his will, in which he left an endowment to establish an institution for the care of those persons, residents of Massachusetts, suffering from nervous trouble, who were not insane.

At that time there was little or no accommodation for such, except at a few private and necessarily expensive resorts. Trustees were appointed by the court under the terms of the will and a charter was obtained from the legislature establishing the Adams Nervine to carry out the wishes of the founder.

For more than fifty years this fund has been expended for the purpose he designated. The trustees bought land and a residence in Jamaica Plain and then erected other buildings. This fund has been under skilful management and has grown slowly, but no large additions have been made to it. As can readily be seen, the income of a fixed fund does not have the purchasing power that it did even fifteen years ago. Those in charge of it do not wish to have the standard of care lowered. This standard from the first has been a high one. One-quarter of the care given at the Nervine is without charge,—yet those receiving this generous rate have the same accommodations and privileges as those paying full price. Another fifty per cent. of those admitted pay less than cost, so that each one of them receives more or less assistance from the funds.

In the charter, provision was made for admitting private patients and any profit made from their care is used to aid those not so fortunate. The doors of this unique institution are made narrow by the terms of the will. It is forbidden by the managers to admit an insane person. On the other hand,—they may not admit any who have not a nervous trouble. This unusual condition appears not to be generally understood.

The Nervine receives from 150 to 170 patients annually. They remain, on an average, about twelve weeks. Those women who find it difficult or impossible to keep on, who are depressed, worried or fatigued, will find here an opportunity to regain their poise. For very many it is found that it is not so much a hospital, as a course in mental hygiene that they require,—and such find it more like attending a graduate school, rather than a place where they may nurse their bad feelings.

The doctor finds that the majority of those who enter are victims of a fear, of one sort or another, possibly subconscious, and these are taught to regain their self-control.

One of the most beneficial curative measures used is the occupation room, where arts and crafts are taught to the beginner. Much surprisingly excellent and artistic work has been created here. When a discouraged person finds that she can really make a beautiful thing, it is often found that she is stimulated.

Another common misunderstanding about the Nervine is a fear of restraint. No restraint whatever is used. No one can be "Sent" to the Nervine. It should be a privilege to enter and those who do not so consider it are not expected.

The place is beautifully situated on attractive grounds in Jamaica Plain, a suburb of Boston, adjoining the Arnold Arboretum. Those who are able to walk enjoy strolling about the Arboretum, and those inclined to study have often made serious study of the trees and shrubs in this wonderful collection.

Dr. Edward B. Lane is the resident physician while the consulting doctors include: Dr. John L. Ames, Dr. Franklin G. Balch, Dr. Arthur N. Broughton, Dr. Francis P. Emerson, Dr. Allen Greenwood, Dr. Horace K. Sowles, and Dr. John J. Thomas. The officers are President Mr. Edward W. Grew, Vice-President Andrew J. Peters, and treasurer Mr. John R. Chapin.

CORRESPONDENCE

WARNING AGAINST AN IMPOSTOR

August 28, 1930.

New England Journal of Medicine:
165 Newbury Street, Boston.
Dear Sirs:

May I warn the profession in regard to a man who consulted me on August 1 giving the name of Lawrence Thorne, 816 Commonwealth Avenue, Boston. He gives a very reliable story of having advanced tuberculosis with hemorrhages and wished my ad-

vice as to what step to take next. He gave the name of his sister, Mrs. Harvey, a nurse in Boston, as his reference. He is apparently after drugs, codeia and morphia.

He paid my small charge with a worthless check on a bank in which he had no account. He gave me the name of another doctor in Lowell as referring him to me. In communicating with this physician, Dr. Adam E. Shaw, he told me he recognized the man from his history and story although he gave him a different name—John W. Davies—but he was evidently seeking drugs. This man gave a history of eleven years tuberculosis experience in U. S. Veterans Bureau hospitals in Massachusetts but on consulting with the Bureau they have no man under either name.

Very truly yours,

JOHN B. HAWES, 2ND, M.D.

"LOOK OUT FOR NEGATIVE SMEARS"

I was called to see Mrs. G. C., widow, age forty-five, at her home the other day. On the history, subjective symptoms and physical findings, my diagnosis was "left chronic salpingitis with an acute attack of same".

After the acute symptoms had subsided a cervical smear was taken at the office. Stained with methylene blue, I found organisms corresponding *morphologically* to Neisser infection. The same slide has been examined by a laboratory man of a well recognized private laboratory and he agreed on the diagnosis.

One smear taken from the cervix has been sent for examination to a public laboratory (stained with gram stain). The report was negative for Neisser infection. Within a few days a second smear was taken. Again the report was negative. The third and fourth smears were reported as containing *suspicious* organisms. The fifth was reported negative. A sixth was taken the same as the previous five with the result that the report came back from the same laboratory *positive* for Neisser infection.

There is no doubt that the laboratory or technician workers are careful and sincere in making these stains and examinations. They cannot and should not report a smear positive unless they are convinced that it is so.

However, the above single case is enough to illustrate how doubtful these reports on the city laboratory smear report cards generally are.

It seems that one single report in a chronic case is not conclusive.

Many a man or woman especially the latter is suffering with a chronic gonorrheal infection because some physician has taken seriously a negative report from the city or some other laboratory.

At times the practitioner forgets that there are other infections of the cervical canal besides gonococci which are generally neglected by simply advising the patient to douche herself:—"for it is only a leucorrhea".

Pain in the legs is not always rheumatism and so vaginal discharge is not always leucorrhea even if the smear is negative for Neisser.

However this is unfortunately diagnosed not only by the laity but also by a great many physicians.

I believe that every vaginal or cervical discharge deserves a microscopical examination. The laboratory man does not discharge his duty by simply stating "negative" on the report card thereby leading astray the average physician or his patient.

If there are any other organisms or even pus the report should so state. When the physician sees on his card "*abundant pus or organisms*" he should take a few more smears to rule out Neisser. The physician as well as the patient should realize that a cervical infection does not always have to be regarded as gonorrheal and should be treated accordingly.

In conclusion let me repeat—Watch and beware of a negative smear.

WILLIAM FRANKMAN.

RECENT DEATHS

SHAW—DR. THOMAS PIERPONT SHAW, a retired Fellow of the Massachusetts Medical Society, died at his home in Lowell August 25, 1930, at the age of 86. Dr. Shaw, a native of Holderness, New Hampshire, where he was born September 27, 1843, was educated in the Lowell High School and at Harvard College where he received the degree of A.B. in 1866. Two years later, having received an LL.B. from the Harvard Law School, he went abroad and on his return practised law in New York City. In 1872 he entered the Harvard Medical School, taking an M.D. in 1877, and settled in the practice of medicine in Lowell. In that year he married Carrie Maria Stevenson of Freedom, New Hampshire. As the result of an accident in 1885 he was crippled and spent the rest of his life in a wheel-chair, although practising medicine until 1909 when his name was placed on the retired list. At one time Dr. Shaw had been a tutor to the late Henry Cabot Lodge.

BRENNAN—DR. JEREMIAH FRANCIS BRENNAN, a Fellow of the Massachusetts Medical Society, died of pneumonia at St. Elizabeth's Hospital, Brighton, August 27, 1930, at the early age of 37.

He was a graduate of Boston College and of Tufts College Medical School, in the class of 1923 and had been a member of the staff of St. Elizabeth's for seven years, making a specialty of orthopedics.

He is survived by his widow who was Kathleen Snow Brennan.

PAGE—DR. HARSTEIN WENDELL PAGE, Superintendent of the Hospital Cottages for children at Baldwinsville from 1899 to 1916, died at his summer home at York Beach, Me., August 29, 1930, aged 73.

He was born at Rockport, Me., October 10, 1856, was educated at Colby University where he received an A.B. in 1880 and an A.M. in 1883. His medical degree was from Bowdoin, in 1888. He served as principal of the high schools at Newport, N. H., and at Ware, Mass., before becoming a house officer at the Worcester State Hospital. He was in private

practice in Worcester until 1899 when he went to Baldwinsville, and again, after resigning the office in the state institution, until his retirement from practice last year.

He was a member of the American Psychiatric Association and of the New England Society of Psychiatry, as well as a Fellow of the Massachusetts Medical Society and a trustee of Colby University.

Dr. Page married Miss Mary Leslie Jenks, Wellesley '88 of Newport, N. H., in 1891. She died early this year.

POPE—Dr. Emily Frances Pope, long identified with the New England Hospital for Women and Children in Roxbury, died at her home in Boston, August 28, 1930, at the age of 84.

A pioneer woman physician Dr. Pope was graduated from the New England Female Medical College, Boston, in 1870. She was on the staff of the New England Hospital for Women and Children for many years, retiring from practice in 1919, in the year when her name was placed on the retirement list of the Massachusetts Medical Society, which she had joined in 1886.

She is survived by her sisters, Dr. Caroline Augusta Pope and Miss A. Lenora Pope and a niece, Miss Luella F. Pope, who lived with her. Their brother, A. A. Pope, was a pioneer in the bicycle business in Boston.

NOTICES

AN INVITATION TO VISIT THE GARVAN CANCER RESEARCH LABORATORY OF THE SURGICAL PATHOLOGICAL LABORATORY OF THE JOHNS HOPKINS UNIVERSITY, JOHNS HOPKINS HOSPITAL, BALTIMORE, MARYLAND, SEPTEMBER 15, 16 AND 17, 1930

Dear Doctor:

This invitation is sent out by The Chemical Foundation of New York to all of the doctors whose names have been recorded in my card index since 1900. A special invitation has been sent through the American College of Surgeons to the staffs of hospitals in this country and in Canada, and Mr. Bruce, Business Manager of Radiology, has issued invitations to 8,000 radiologists on his card index; you may therefore receive more than one invitation. You may extend this invitation to any of your colleagues in private practice or on a hospital staff, who may be interested.

You are cordially invited to come to Baltimore, Maryland, Monday, Tuesday and Wednesday, September 15, 16 and 17, 1930, for a postgraduate teaching course, with lantern slides, on "The Diagnosis and Treatment of Bone Tumors." We wish to emphasize chiefly the x-ray picture of the involved bone or bones, and the microscopic high-power picture of the lesion itself.

The demonstration will be held in the ballroom of the Belvedere Hotel, Charles and Chase Streets, Baltimore, Md. The number of those attending must be limited to 800. Should a much larger number accept and if there is time, a larger hall will be provided. If not, you will be notified if your acceptance is received after the limit has been exceeded.

If you desire to attend this demonstration, which begins Monday morning, September 15 at ten o'clock, Daylight Saving Time, write at once to the manager of the Belvedere Hotel and make your reservations. It is requested that you specifically state whether you will be there Monday, Tuesday or Wednesday, or all three days.

The manager of the Belvedere Hotel will be willing to give reduced rates to those who desire them; so when you write, ask for the usual rates for a single room with and without bath, and for special reduced rates for three or more in a room, with and without bath, and for the special reduced restaurant rates for club breakfast, luncheon and dinner. There will be no charges to meet other than your railroad fare to and from Baltimore and room and meals at the Hotel.

Keep the final letter from the Belvedere Hotel and present it when you register.

In the demonstration we will employ four lanterns and show four slides at one time. In order not to tire the audience, the demonstrations will be from 10 to 12:30 in the mornings, 2 to 4:30 in the afternoons, and 7 to 9:30 in the evenings. There will be a demonstration Wedneday evening. Should the number of cases registered for Wednesday be larger than can be shown, the meeting will extend to Thursday morning and afternoon for those who wish to remain over.

Monday will be devoted to the simplest fundamentals of the clinical picture, x-rays and gross and microscopic pathology of osteitis fibrosa, giant cell tumors, osteomyelitis, Paget's disease, exostosis, chondroma, myxoma, various types of sarcoma, multiple myeloma and metastatic tumors.

Tuesday will be devoted to the comparative study of the different lesions of special bones—lower end of radius, upper end of humerus, vertebrae, etc.

Wednesday will be reserved for the presentation of rare and very difficult to diagnose lesions of bone.

Anyone attending this meeting may register a case or cases by addressing Miss Maude Walker, Secretary to Dr. Bloodgood, Surgical Pathological Laboratory, Johns Hopkins Hospital, Baltimore, Md. Accompanying this registration should be the x-ray films, or lantern slides, a brief clinical history (if possible three typewritten copies) and, if an operation has been performed, sections or tissues from the case.

If possible select a case in which there have been five years or more since the first observation, providing the ultimate result is known. The final result after five years usually makes a diagnosis certain.

If you can not send lantern slides, we will make them ourselves from x-ray films and microscopic sections. Later, with your permission, your case will be registered with the Bone Sarcoma Committee of the American College of Surgeons, so that

it will be always available for comparative study in this great collection, due to the energetic work of Codman of Boston and Crowell of the American College.

Sincerely yours,

JOSEPH BLOODGOOD.

RECENT PROGRESS IN THE LABORATORY

Human cancer is not receiving the attention justified by its position among the chief causes of death of human beings today. For this reason, I am very anxious to keep you posted on the successful part of the experimental work going on in the Surgical Pathological Laboratory, with the definite purpose of stimulating similar ventures in other surgical and surgical-pathological laboratories of medical schools in this country.

During the past two years, because of the improved financial conditions in the Surgical Pathological Laboratory due to five generous funds, we have been able to increase the number of paid instructors and to offer a larger number of elective courses to first, second, third and fourth year students. For this reason, among the graduate classes in the past two years more men and women who have taken a longer course in the Surgical Pathological Laboratory have become convinced that if they take up the specialty of surgery, radiology or pathology, they are not only better equipped for the problems of diagnosis, but that they need more postgraduate intensive study.

Apparently due to the splendid and continuous publicity in the daily press, more and more people are realizing the dangers of cancer and the necessity of clinical and experimental studies on a much larger scale in the medical schools of this country, and in the laboratories not connected with medical schools. This is shown, first, and for a larger number of years, in the increasing gifts from private individuals to the various laboratories of this country, and more recently the increasing momentum of public opinion which undoubtedly made possible the passage of the Ransdell bill creating the National Institute of Health. When the National Institute of Health has sufficient endowment for maintaining the research fellowships provided for in this law, the Surgeon General of the Public Health Service and his advisory board will be able to help more and more the experimental laboratories of the medical schools.

In addition to this educational activity in the laboratory and the public coöperation which can be expected through the new National Institute of Health, definite progress has been made, we feel, along the lines of experimentation and investigation.

By a continued study of the records in the laboratory which have been accumulated over the past forty years, we find that in the areas of the body where inspection by the patient is possible, such as the skin, oral cavity or breast, more and more cases are coming under observation with a benign lesion or cancer in its earliest stage. In other words, there is a coincident decrease in the incidence of malignant lesions and a rapid rise in operability and curability. This improvement seems entirely dependent upon correct information in regard to cancer published in the daily press. Although this education began in 1913, its value was not established in terms of results until 1920, but in the past few years, its effects have been most marked.

Because of this changing clinical picture in tumors as seen by the practitioner, it is becoming more and more difficult to distinguish malignant disease in its earliest stages from benign local conditions. It is becoming evident that radiologists must, in some way, get a more intensive training in diagnosis of x-ray pictures and surgical pathologists an entirely different training in the fresh frozen section made and studied with the microscope at the time of the operation. For this reason, in June just passed, invitations were extended to pathologists and surgeons interested in tissue diagnosis in the operating room. The number of those who could attend was limited by the capacity of the Copley Surgical Pathological Laboratory adjoining the Garvan Experimental Laboratory; yet more crowded in. With two at a microscope, we were able to show about twenty-one sections difficult to diagnose. In not a single case was there an unanimous diagnosis, but as a rule the majority was right and the minority wrong. There was often difference of opinion among the best trained and most experienced surgical pathologists. In 1915, I had a similar demonstration and recorded the fact which has been confirmed in the past fifteen years, that the majority of pathologists were wrong in the border-line cases. In 1915, the majority voted malignant on the difficult to diagnose benign lesions. At the meeting in last June the majority voted benign in the benign lesions.

In an attempt to simplify the problem of differentiating the benign from the malignant in the earliest stages of local lesions, especially in the breast, bone and uterus, and lymph gland, we needed a differential stain for the cancer cell. In my last appeal to a number of thousands of patients, I asked for $10,000 to build an experimental laboratory to adjoin the Surgical Pathological Laboratory and $10,000 a year to try to discover a differential stain for the cancer cell. Unexpectedly and fortunately at the proper time, Mr. Francis P. Garvan gave the money for the projected laboratory and promised $10,000 for five years. Dr. Charles F. Geschickter, who was then a Fellow in the Mayo Clinic, was given the first fellowship in the Garvan Experimental Laboratory. After a four months' visit to Europe, he began work in the laboratory in October and was able, in June, to demonstrate to the visiting pathologists, not a differential stain for the cancer cell, but a new stain for fresh tissue cut by the freezing method. These sections were just as good, if not better, than those stained by any other method, and because of the discovery of a new principle had the advantage of permanency. The new stain could also be employed for frozen sections from fixed tissue. During this demonstration to the pathologists in June, there were prepared by this method sixty sections from three

cases within a few hours, and these sections were shown to the visiting pathologists.

The generous and very much needed gift of Mr. Garvan had a remarkable influence on old and new patients of mine. Mr. Ira C. Copley of Illinois and California gave me $5,000 a year for five years, and other patients brought the amount of contributions to the Bloodgood Cancer Research Fund to more than $15,000 a year. About the same time The Chemical Foundation, of which Mr. Garvan is President and Mr. William W. Buffum is General Manager, furnished the money to equip and maintain a laboratory for the cultivation of the human cancer cell. This experimental work was entrusted to Mr. and Mrs. George O. Gey who had had four years' experience in this work. At the present moment, they have cultivated the human cancer cell to a larger number of generations than has ever been done before and are of the opinion that very shortly they will be able to grow—outside the human body—the human cancer cell just as readily as the animal cancer cell.

With the aid of these increased funds and the help of Professor Dean Lewis, Chief of the Department of Surgery, we have been able to establish in the Hunterian Laboratory of the University the beginning of a definitely planned series of experiments in the search for a differential stain of the cancer cell in animals by means of intravital staining and also to test out intravenously all new and old so-called cancer cures. Through the generosity of Dr. George Walker of Baltimore we have obtained some remarkable cancer bearing animals. This experimental work is in the charge of Dr. Ferdinand C. Lee, Department of Surgery, and Mr. R. Carmichael Tilghman, a medical student holding a fellowship in the Surgical Pathological Laboratory.

THE FOLLOW-UP SYSTEM

All of you who have sent me a patient or an x-ray or a bit of tissue or section, or have corresponded with me on any subject have received from the laboratory a pink slip asking for the present result in the case. We thank you for your prompt answers and your coöperation. I take the opportunity here to make a few statements which will improve our follow-up system.

At the present time there are about ten per cent. of "lost" cases, and by persistent efforts, especially through you, we are finally ascertaining the results in fifty per cent. of the patients lost track of. It will interest you to know that the ultimate result of temporarily lost and ultimately found patients is identical with those not lost. The same is true of patients to whom letters have been addressed, but have been returned marked "dead." This does not necessarily mean dead of the disease.

That is why we continue to send you the pink slip after you write us that you have lost track of the patient, because again and again, even years later, the patient returns to your observation, and were it not for the pink slip, you would probably not inform us of the reappearance of the patient and the result.

The Fellows working in the Surgical Pathological Laboratory would appreciate the immediate return of any pink slips that you may have in your possession, even if you can make no notation except that the patient has been lost track of. Then please write the names of the patients that you may remember as having sent to us for record or diagnosis and the results as you can remember them now. We need no other data, except your name and the name of the patient or patients. If you remember the location of the lesion and its character, please note it.

We can only acknowledge, with our grateful thanks, your coöperation. The only way in which we can more substantially show our appreciation is by again informing you that the Surgical Pathological Laboratory of the Department of Surgery is not a commercial enterprise, and it stands ready to aid you in the diagnosis of tissues or x-rays, or in the study and publication of problems in surgical pathology. No charges will be made to doctors or patients, unless the patient is amply able to afford them and has properly compensated all others, and a request is made for a bill to be sent to the patient. If any mistake is made along this line, we hope you will notify us at once.

Our concluding announcement is, that we will now be able to give a demonstration to which you are invited by this letter, at least once a year, and ultimately this demonstration will be given to as large a number as may wish to attend. The demonstration to fifty-five surgeons, radiologists or pathologists who were interested in tissue diagnosis in the operating three days during the Christmas and Easter vacations Easter vacation and in June. Whether you accept this invitation to the x-ray demonstration in September or not, please write and register if you desire to attend the microscopic demonstrations on two or three days during the Christmas and Easter vacations and in June. You may register for one, two or three. We have received a number of letters from those who attended the meeting in June requesting further opportunities, and many of them asking for a simpler course. We will provide for what is requested by those who attend these microscopic courses in surgical pathology.

Write the Belvedere Hotel and make arrangements for your rooms. Address the letter registering your case to be demonstrated on Wednesday in September with Miss Maude Walker, Surgical Pathological Laboratory, Johns Hopkins Hospital, Baltimore, Md. If you desire to register for one or more courses in surgical pathology, write a separate letter and mail it in a separate envelope addressed to Miss Walker.

Sincerely yours,

JOSEPH COLT BLOODGOOD.

SPECIAL ANNOUNCEMENT

On January first, The Chemical Foundation, 654 Madison Avenue, New York, N. Y., of which Mr. Francis P. Garvan is President, and Mr. William W. Buffum is General Manager, will issue a new and enlarged *Americal Journal of Cancer* edited by Dr. Francis Carter Wood and a large number of associate editors and collaborators, representing every phase of the cancer problem—clinical and experimen-

tal—with extensive reviews of the literature throughout the world. This *Journal* will replace the *Journal of Cancer Research*. It will be the official journal of the American Society for the Control of Cancer and the American Association of Cancer Research Workers. For the first time, in one journal, research workers can read about the educational and clinical side of human cancer, and clinical members of the medical profession will be brought in contact with cancer research throughout the world. The *Journal* will also carry the important and essential messages and contributions of the American Society for the Control of Cancer.

I take this opportunity to suggest to you that you subscribe to this *Journal* at once, addressing Mr. Buffum.

Radiology, the official journal of the Radiological Society of North America, under the editorship of Dr. Maximilian J. Hubeny and his associates with Mr. J. R. Bruce, Bruce Publishing Co. of St. Paul, Minnesota, as Business Manager, has been included among the publications financially aided by The Chemical Foundation in its endeavor to aid in the promotion of research and enlarged and improved medical journals.

I venture to make the statement that every member of the medical profession should try to keep abreast, no matter what his specialty, of the cancer problems, and even every general practitioner should familiarize himself by conscientious reading with the fundamentals and latest discoveries. These two journals should keep you accurately informed. By subscribing for them and improving your vision and knowledge of cancer you will make your personal contribution to the ultimate control of cancer. Something must be done for its control. In spite of all that has been done, cancer deaths are on the increase, and cancer has changed from eighth to second place in the mortality rates in the past nine years.

Sincerely yours,

JOSEPH COLT BLOODGOOD.

REMOVALS

Dr. J. Charles Seymour announces the removal of his office from 51 Providence Street, Worcester, to 718 Commonwealth Avenue, Boston.

Dr. David Ayman announces the removal of his office from 485 Commonwealth Avenue, Boston, to 484 Commonwealth Avenue, Boston.

Dr. Channing S. Swan has moved his office from 46 Gloucester Street, Boston, to 264 Beacon Street, Boston.

NOTICES OF MEETINGS

THE ANNUAL CONVENTION OF THE AMERICAN ACADEMY OF PHYSICAL THERAPY

The American Academy of Physical Therapy will hold its annual convention in Boston at the Hotel Statler, October 22, 23, 24.

An interesting program has been arranged. Physicians even though not members of the Academy are cordially invited to attend the exercises.

Applications for programs or other matters of interest may be addressed to Thos. L. Smith, M.D., Allentown, Pa.

BERKSHIRE DISTRICT MEDICAL SOCIETY

The annual Clambake of the Berkshire District Medical Society will be held on September 10 at Onota Lake in the Camp of Dr. J. H. Sullivan.

The September meeting of the Society will take place at the Park Club at eight o'clock in the evening on September 19. We have secured as speaker, Dr. Edward A. Archibald, Professor of Surgery at McGill University, Montreal. Dr. Archibald has chosen as his subject, "Indications for Surgery in Pulmonary Tuberculosis."

HUGH DOWNEY,
Secretary.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

March-October — International Medical Postgraduate Courses in Berlin. Complete notice appears on page 853, issue of October 24, 1929.

September 8-12—Postgraduate week of Physical Therapy. Detailed notice appears on page 1025, issue of May 22.

September 14-18 — Fifth International Congress on Physiotherapy. Complete notice appears on page 906, issue of October 31, 1929.

September 16-17-18—Clinical Congress of the Connecticut State Medical Society. Complete notice appears on page 194, issue of July 24.

September 26-27—New England Surgical Society. Detailed notice appears on page 1028, issue of May 22.

October 13-17—Clinical Congress of the American College of Surgeons. Complete notice appears on page 1175, issue of June 12.

October 20-24—International Assembly of the Interstate Postgraduate Medical Association of North America. Detailed notice appears on page 291, issue of August 7.

October 22, 23, and 24—The Annual Convention of the American Academy of Physical Therapy. Complete notice appears elsewhere on this page.

October 27—The American Public Health Association. Detailed notice appears on page 1271, issue of December 19, 1929.

March 23-27, 1931 — Fifteenth annual clinical session of the American College of Physicians. Detailed notice appears on page 790, issue of April 17.

July 27-31, 1931—Third International Congress of Radiology, Paris. Complete notice appears on page 385, issue of August 21.

DISTRICT MEDICAL SOCIETIES

Berkshire District Medical Society

September 10—Clambake. Detailed notice appears above.

September 19—Meeting. Detailed notice appears above.

Franklin District Medical Society

September, 1930-May, 1931—The meetings are held on the second Tuesdays of September, November, January, March and May at 11 A. M. at the Weldon Hotel, Greenfield.